

# AVIATION WEEK

A McGRAW-HILL PUBLICATION

APRIL 4, 1955

50 CENTS

## THE BEGINNING OF A NEW FUTURE

America's first jet transport, the Boeing 707 prototype, has already flown higher and faster than any other transport airplane.

Projected commercial versions would carry up to 150 passengers, cross the Atlantic in under seven hours and the U.S. in less than five.

The military tanker version, the KC-135, has been ordered by the Air Force and production is already under way.

America's first jet transport incorporates many revolutionary features as well as a great many proven ones in her design. One of the latter is her fuel gage system—the Honeywell Electronic Fuel Measurement System.

Boeing chose it over all others because experience has shown it to be the most reliable, accurate and easiest to maintain.

Many others, both aircraft manufacturers and air lines, have arrived at the same conclusion, as the Honeywell Electronic Fuel Measurement System is going into every make of U.S. commercial transport plane now in production. It's used on more than 80 types of military and commercial aircraft.

Electronic Fuel Measurement Systems for aircraft and missiles—including the new transistorized version—represent only one of the many Honeywell products in our line of controls for everything that flies. We expect the list to grow longer in future years—because automatic controls are so important to aviation progress. And automatic control is Honeywell's business.

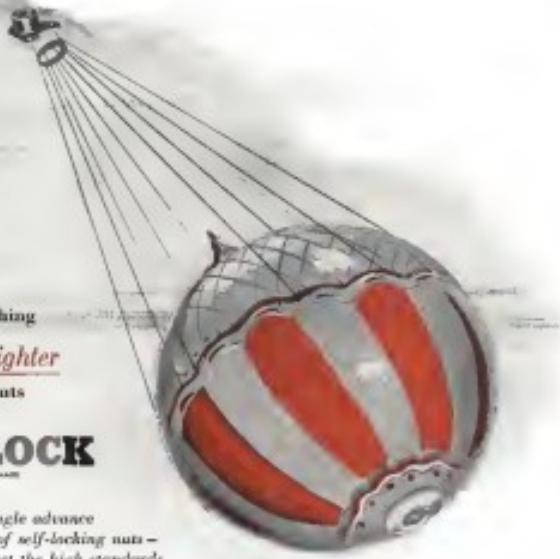
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RESEARCH KEEPS

# B.F. Goodrich

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THE KAYMAR COMPANY - KAYLOCK DIVISION - BOX 292, TERMINAL ANNEX - LOS ANGELES 54, CALIFORNIA  
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## World's first 300 mph airplane tire —and it's B. F. Goodrich Tubeless!

**B. F. Goodrich**, inventor of the Tubeless Tire, announces a great new aviation advance—the world's first 300 mph airplane tire. Developed for ultra high-speed military use, the new Tubeless Tire established the record for a high-speed landing on B. F. Goodrich's new 300 mph dynamometer in Alaska, shown above.

To simulate the complex stresses of aerial landings, the new B. F. Goodrich 300 mph Tubeless Tire was set to the dynamometer's flywheel at an angle. Strained against the whirling flywheel under 10,000 lbs. load, it instantly

developed speeds up to 4,000 rpm—a combination of impact, friction and centrifugal force can withstand stresses as ordinary tire. After the 300 mph landing, the new Tubeless Tire showed no signs of failure. Most landings were made surpassing requirements for the car. And even after 15 straight landings at 300 mph, the tire was good for more.

The new 300 mph tire is the latest addition to the B. F. Goodrich airplane Tubeless Tire line. Already in military and commercial service, B. F. Goodrich Tubeless Tires speed maintenance, cut weight-saving in much as 75 per cent of tire weight. They give safer take-

offs and landings because tube troubles are eliminated.

Instead of an outer tube, the B. F. Goodrich Tubeless Tire has a patented inner liner that part of the tire itself.

Results? There's no tube to blow out. No tube to add weight. And there's only one way to mount and dismount.

This new 300 mph Tubeless Tire is another example of B. F. Goodrich leadership in Tubeless Tire research and development. The B. F. Goodrich Co., Akron, Ohio, U.S.A.

**B.F. Goodrich**  
FIRST IN RUBBER

# Aviation Week

APRIL 4, 1955

VOL. 42, NO. 14

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## Small gas turbines pass test of time

New Milestones Gain Industry-wide Acceptance for AiResearch Power Turbines

AiResearch small gas turbine engines, first of this revolutionary class of turbomachinery to be developed, have now passed the following important milestones:

• 200,000 hours of actual service in the field • Successful operation up to altitudes of 35,000 feet • Completely reliable automatic control on produc-

tion units capable of delivering either shaft or bleed air power independently of each other. AiResearch has made records on new models of 1000 hours.

• All phases of military qualification (including low shaft power and jet turbine bypass designs).

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first to develop and deliver aircraft

jet engines capable of delivering either shaft or bleed air power independently of each other. AiResearch has made records on new models of 1000 hours.

We are proud of the outstanding manufacturing team that has made possible these outstanding contributions to industry.

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Designers and manufacturers of aircraft compressors, aircraft piston engines, aircraft turboshaft air engines, transonic turbines, aircraft propellers, aircraft landing gear, aircraft hydraulic systems, aircraft fuel systems, aircraft electrical equipment, aircraft instruments and controls.



America's new XP6M is a radical departure in composite design. It features a massive, riveted hull and no engine nacelles atop the wings. Four Allison 251 engines with integral afterburners push the aircraft to well over 400 mph and to altitudes of over 40,000 feet. Clifford equipment is shown at right.

## Martin XP6M's Cockpit Temperature and Anti-icing Controls Have Novel Features



New Clifford system employs lightweight control box with miniaturized construction, miniaturized components, novel pulse element, and unique skin temperature sensing elements.

In addition to its small size and light weight, Clifford's new control box design embodies several important advantages in service. Its compact construction makes it comparatively simple to locate a malfunction. In service, quickly replace the unit containing the defective component, and get the plane back into the air.

Miniaturized, ruggedized components result in the smallest, lightest control possible for the job to be done. Elements within the box are controlled by a common control box. The cockpit temperature control system is entirely separate, having its own control box, sensing elements, and associated high temperature air valves.

**Information or consultation** involving temperature control systems custom-built to the requirements of specific aircraft on which you may be working is available without obligation.

**Write:** Clifford Manufacturing Company, 136 Grove Street, Waltham 54, Mass. Division of Standard-Thomson Corporations. **Tel:** 222-2222.

**New skin temperature sensing element**, smallest such units ever made, has been developed by Clifford temperature control systems. The unit can now record temperatures during flight.



Smallest amount of wire required to connect probe to control system.



**XP6M**



### Domestic

American Airlines last week ordered an additional 14 DC-9s from Douglas Aircraft Co., with take delivery on the new transports in 1958 and 1959. When the orders are filled, American will have a fleet of 39 DC-9s, 82 DC-8 types, 75 Convairs and nine DC-4s.

New York's LaGuardia Airport will begin all aircraft operating at the field after May 1 to have two-way radio capable of reaching the control tower at both ground and underground VHF channels.

The American World Airways Stratocruiser ditched 10 miles off the Grigors coast Mar. 25 after the No. 3 engine shock strut loose from the wing.

New \$1 facilities calibration and test building for nuclear engines is being constructed by North American Aviation at the company's production and laboratory plant located for Los Angeles. The facility is scheduled to be completed July 30 and activated late this summer.

Five Sikorsky H-16s will take off Apr. 17 from Camp Barker, Ala., on a 15-step delivery flight to Ft. Lauderdale on the Coast Guard. The Army helicopter will be demonstrated at sites for government officials of Calo, Guatemala, El Salvador, Honduras, Nicaragua and Costa Rica.

Chase Vought Aircraft, Inc., Dallas, received a "weight control dollar" subcontract from Boeing Airplane Co. for production of modified B-47 nose section.

First P2V-7 Neptune of a contract ordered by the Royal Canadian Air Force was delivered to Lockheed Aircraft Corp. at Burbank, Calif. RCAF's 100th Neptune will be the second profit unbalanced orbit folded tail, marking first time a U.S. or foreign flag carrier has selected a sub-assembly for anti-submarine and carrier patrols.

United Air Lines will offer overnight freight service under a new agreement with Air Express International Corp.

Stress analysis of propeller blade rotation criteria will be studied by the Illinois Institute of Technology at Chicago under a \$25,000 research grant from USAF's Wright Air Development Center.

AC Spark Plug Division, General



### Vector-System Helicopter Is Easy to Fly

Vector system converts cyclic pitch control on the dc Lachute DH-6 into roll control. Prototype weighs 110 lbs; production version is expected to weigh only 125 lbs. Two 25-hp, seven-cylinder opposed piston engines drive a 30-hp Reichenbach Mercury liquid-cooled motor. Top speed is estimated at 60 mph and range at 15 miles. Miller Bell Systems Inc. is among other companies developing helivertors at bases of Navy and Marine contracts.

Motors. Mikromotor, Inc. entered the target fuel control systems field, with initial units scheduled for afterburner jet aircraft work. Work was done by GM's Products Division at Rochester, N. Y.

### International

First pre-production version of SNCASO's S.60-401B bomber aircraft was delivered to the French Air Force by Michelin Véhicules au Sol. Powered by two 6,000-hp thrust SNECMA Atar 101 turbjets, the Véhicules has exceeded 610 mph during test bombing runs.

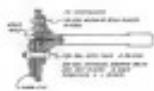
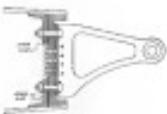
Labor troubles may keep West Germany's Luftwaffe from starting operations soon that year. Negotiations between the Luftwaffe and German transport workers have stalled after labor representatives rejected Luftwaffe's wage offers, reported to be about 70% of the average for air forces in northern Europe.

The Super Constellation 1049s, leased by British Overseas Airways Corp. from Seaboard and Western Airlines, started service April 1 as BOAC's New York-Bahrain route.

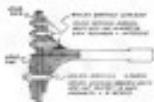
British's Flight Refueling, Ltd., plans to build a production plant in Canada, probably at Toronto. The new manufacturing facility will be operated by the company's subsidiary, Flight Refueling (Canada).

Guided Missiles will be developed by Canada's Avco Avimil, Ltd.

# WHY SPOT FACE AWAY THE FITTING?



Excessive spot facing, weight, and bulk are eliminated from removable fittings such as aircraft hinge brackets; when HI-SHEAR spot rivets are used to carry the shear loads. On the above example four bolts speed up removal or installation of the fitting at the shop or on the flight line.



Fittings using bolts to carry the shear loads, require spot facing in blind areas. These fittings must be heavier in weight or reduce strength to avoid stress concentrations and become larger in size to absorb shear forces. For example, the fitting with bolts suffers a weight increase of about 30% and requires removal or installation of an additional fastener bolts.

**WHITE**  
For the HI-SHEAR Standards  
Mailed for specific data on the  
HI-SHEAR shear rivet.

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## The Aviation Week

April 4, 1955

### Headline News

Gengras Splicing Over Tensile Stress  
Dover Gets \$1.5 M. for NAVFAC  
Landing Gear and Engine Components  
Air Defense Test Bat Assures Success  
USAF Starts Radar Measurements  
Pilots Evaluate Preliminary  
Fuel Transfer System  
Contractor Mayors Answer Obligations  
CAR to Air Inspection Program  
Bell Airliner Copilot As Other Passengers  
Learjet Gets New Award  
NRC Reports Aviation Stock Decline

### Aeronautical Engineering

NASA Reports Turbine Tests  
New Air Weapon System Is Enriched  
Defense Dept. Opens Titanium Lab

### Production

Bell-Boeing Wins New Assembly Line  
New Guidance System Bell Completes  
First Welding Line Extension  
Production Building

### Equipment

Span-Weld Insert Locks Bolts  
Governs Speed Growth of NASA  
Off the Line

### Air Transport

CIA Buys Up Numbered Logistics  
Capital Traffic Case Sets Flight  
Safety Record  
SAE Executive Arbitrators Committee  
Singer Committee Publishes Report  
Pilot Death Service Unlikely  
L-101 Jet Trainer Delivered  
LATA Gets Arctic Corps Base  
LA Airport Basses Best  
Flight Links to York Shutter  
CAB Orders  
Shuttle

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More Wiggle Flying In Relation

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## WHO'S WHERE

### In the Front Office

**Robert B. Murray, Jr.**, former Commandant Undersecretary for Transportation, has recently joined Reliance Leasing-Hamilton Corp., New York, to spread word of the potential.

**Stanley C. Kennedy, Sr.**, will resign as president of American Airlines and his successor will be Arthur D. Lewis, who joined the airline last month as executive vice president.

**General James E. Doolittle**, former director of Civil Aeronautics Board's Bureau of Air Commerce, was elected honorary president of Shock Absorber Association. New director John K. Allison, past president of National Aircraft and former Associate Secretary of Commerce for Air, also Gen. Fred S. Bowles (USAF Ret.), and John S. Gossman, USFAA (USAF Ret.), and former Secretary of the U.S. Treasury.

**Charles H. Collier** became vice president engineering and maintenance for General Air Lines.

### Changes

**George G. Eaton, Jr.**, was appointed senior military engineer for Worldwide, Inc. Eaton Corp.'s Air Arms Division, Baltimore. Other changes: Robert H. Karsl, senior research engineer of production, Thales Clark, assistant to the managing engineer.

**Dr. Carl L. Kamm**, chief hydrodynamic engineer, Geronimo's Windmill and V-2 rocket tailoring system, in World War II and has worked at USAF's Wright Air Development Center since 1946, joined General Mills to take charge of airborne systems evaluation for the Metuchen Division.

**Ronald M. Blane** moved up as General Motors Corp.'s Allison Division at Indianapolis from managing director to technical manager in the general manager position. Gordon, former chief engineer of Allison, is now director of engineering, advanced design and development. Other changes: R. E. Sette and E. S. Nichols, executive engineers; G. J. McDonald, chief engineer of advanced design and development; J. H. Williams, manager chief engineer advanced design; F. H. Hinckley, chief engineer of materials; P. J. Gandy, chief engineer of fuel systems; F. G. Schenck, assistant chief engineer.

**Jack W. Galle** is new general manager of Delta Airlines, according to W. D. Price, Jr., who resigned.

**John Dorn** was promoted by American Coliseum annual series, to traffic and sales manager.

### Honors and Elections

**Dr. Theodore Von Karman**, professor of aeronautics at California Institute of Technology, Pasadena, was elected to a life-long membership in the French Academy of Sciences and elected to the rank of full commander in France's Legion of Honor.

## INDUSTRY OBSERVER

**Wright J55 Supersonic turboprop** survived a rugged emergency on the Lockheed F-104 at Edwards AFB, Calif. Tom LeVire, Lockheed test pilot, was making landing runs with the F-104 when an oxygen cartridge leak punched a hole in a fuel tank. Raw fuel spewed into the engine, causing extensive rough running. LeVire managed to bring the plane in for an emergency landing on the dry lake bed. Supersonic undamaged no damage from this rugged accident!

**Bell's new order for KC-135 jet tankers** (AVW, p. 13) comes to 168 planes. This is in addition to the original program for 85 tankers established when USAF gave Boeing its initial KC-135 order last year. KC-135 program now calls for 257 aircraft.

**Pilatus Aircraft Corp.** drag伞 studies for large helicopters are aimed at 30,000 lb gross weight and a 1,000 ft payload. Current helicopter heavy-weight is the Puma II-15 at about 32,000 lb.

**A new no-flight tailoring system**, using two semi-solid tubes and a bellhop configuration to replace the normally used stretching hoop, has been patented by Flight Refueling Inc., Baltimore, Md. Company makes precision stretch tailoring equipment (AVW Jan. 26, 1955, p. 28).

**TF-102**, Convair's latest version of the supersonic interceptor, is scheduled to fly in October at Edwards AFB. Craft has widebody seating, will carry two radar scopes, have state-of-the-art control system as F-102 and will be fitted to take full instrument, indicating that it is intercepter, with its paper score board, it could be used for combat service.

**Canada's Avia Aircraft** will fit Ordnance-Powered CF-100 with experimental turboprop thrust reverser (focusing within tailpipe) for about 15% boost in power, as association with Margaret Aircraft Co. developed variable-dome, mix-type nozzle, previously used to give enhanced operating for supersonic flight conditions during cruise. Instep and side body fairings promise less resistance into reverse thrust device, in addition to its basic job as exhaust nozzle.

**Republic F-105**, supersonic fighter-bomber, probably will be rolled out in about three or four months. Plane will incorporate wing root air intake for its Allison J71 turbojet powerplants.

**Avro Canada's C-105** long-range interceptor is scheduled for rollout this fall. Initial quantity will consist of one static test article and two prototypes. Additional schedule for 10 more of the planes may come soon. Plane will be fitted with Hughes fire control system.

**Ryan jet-powered Firebird target drone** may be used for photo reconnaissance and as a combat missile with own guidance. Plane should have good tactical potential because of its performance—over 600 mph speed, more than 40,000-ft altitude, 1 to 20 min duration, 500 lb payload.

**Hughes Aircraft's Fokker** satellite will be refined with a streamlined orbiter with good electronic characteristics, replacing the round blunt-based model that was recently released. Fokker plans: USAF pilots who use the services of the Fokker operating agent if I-40 downed were startled by its effectiveness.

**Cornell Aeronautical Laboratory** is conducting wind-tunnel tests on the Grumman F9F-9 Tigercat's supersonic fighter. Windtunnel tests are being made to obtain more accurate engineering data on the F9F-9. More than 150 of test time have been logged in the variable-density wind-tunnel, all of it in the transonic range.

**French Gustav HB** delta-wing prototype of a forthcoming supersonic fighter, which has been flying with a new wing of increased area, has exceeded Mach 1 in level flight. Gustav HB exhibits much shorter takeoff and landing characteristics than the earlier JA.

## Washington Roundup

### Shakeup in Pentagon

Responsibility for major shakeup in military public relations, which left the Pentagon's hand-blown bell nearly melted out in the White House while two aircraft Navy instruments left intact, including one on the President, Defense Secretary Charles E. Wilson took the bell by the horns after getting a dressing down from his boss, then made off with the damaged and a reported to have written the directives himself.

Intense debate ensued at the National Affairs Board. Robert A. Gorney's use of a small press conference to give the public his version of the circumstances went well with Chairman and Comr. George P. Wofford's forthcoming series of articles for the Saturday Evening Post on the above reference.

First director from Wilson's office put a curb on military people who went to talk or write for public relations, ordered them to get clearance from the civilian secretary of their own service before talking or writing.

Verbiage exerted some restraint in public information offices but while the discussions went on the second bell still dropped. It was an order calling for eventual rotation of one-half to one-half of information staffs and replacement of big military officers by professional civilian public relations personnel. Men to be replaced are Army's Maj. Gen. George C. Madgett, Navy's Rear Adm. William G. Beaudoin and USAF's Brig. Gen. Brooks E. Allen, who was in the process of giving up that chair to Col. Robert Lee Scott (AW Feb. 28, p. 12).

Indications are that the shakeups were concluded, at least at the numbered levels, in the chairman cases as at present. Still awaiting confirmation is Wilson's declaration that everyone in the department will hold personally responsible for seeing that information they release is "consistent with the national security and the policies and objectives of the Department of Defense."

Almost certain to be interpreted as a gag on critics is Wilson's view that there must be "a determination of whether release or publication of the material would constitute a counteractive contribution to the privacy interests of the Department of Defense."

### Preparedness Investigation

Senate Armed Services Committee has served its Preparedness Investigating Subcommittee, which made top priority its report on the preparedness programs at the last Democratic Congress (1951-52). Four members named to the group also served on the sub investigating subcommittee: Sen. Lyndon Johnson, chairman; Sen. John Stennis, Sen. Styles Bridges, Sen. Styles Bridges and Sen. Leverett Salterwill. The two men, members Sen. Stuart Symington and Sen. Ralph Flanders.

Two subjects the subcommittee is expected to consider are the guided missile program and AFM-1. Stennis and Symington have already recommended these investigations (AW Mar. 7, p. 10).

### More Airline Audits

Civil Aeronautics Board plans to increase its audits of airlines—if its fiscal 1956 budget request of \$9 million is approved by Congress. This is about \$100,000 more than CAB had for this fiscal year. CAB member Chan Gramas told Senate Appropriations Committee that audits of subsidized carriers would be made every year and audits

of non-subsidized lines, every other year. At the present time, subsidized carriers are audited every other year—unsubsidized, every third year.

Senate committee opposed to the action of House Appropriations Committee in cutting CAB's request of \$13.2 million for subsidy payments from new total July 1 to \$5 million.

### Army Sensitivity

Creation of new Aviation Division in Office of the Assistant Chief of Staff, Operations (G-2) (AW Mar. 23 p. 20), already has resulted in combat loading Army in high-priority areas, particularly overseas. This, in setting up their own Air Force. Pentagon observes that Army's failure to assume clearing of its mission activity in new status was due to its eagerness to avoid any press quote, opinion from Congress while budget is under consideration.

Brig. Gen. Blanton R. Howes, chief of the new division, has returned from his mandatory tour of Army air establishments, study to tackle a tough job calling for maximum deployment of skill to fit through military and legislative task that is bound in burnt seeds.

Little known fact about the Army's new aviation chief, which provides an interesting quirk of history, is name of his father: Maj. Gen. Robert Lee Howes. Through ancestry, the older Howes was president of the New England coast that over-mastured Bill Mitchell, ousted him out of the Army for recommendation on air power issue.

### Fewer USAF Generals

Air Force plans to reduce the number of general officers from 410 to 443 during the next fiscal year have been disrupted. A Senate Armed Services Subcommittee has recommended a ceiling of 425 on the number of USAF generals by July 1956. For the other services, the subcommittee recommended these ceilings: no general officers as of that date.

• Army, 394. This is the number planned and two less than the present 496.

• Navy, 287. Navy planned 298, at present has 284.

• Marine Corps, 63. This is the present number and the number planned.

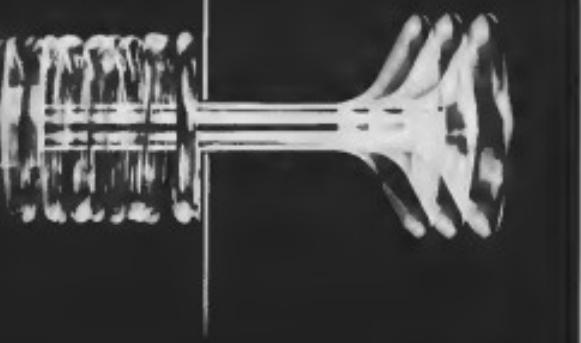
### Airport Tangle

Despite over a tangle to Washington's crowded airport situation continues with no sign that recommendations of the Presidential Advisory Committee offer any substantial answer (see p. 21). Chief stumbling block is a suggestion that Baltimore's Executive Airport be used as an alternate to Washington National Airport to relieve congestion.

Maryland Senator John Marshall Butler has packed up the ball in the effort to force the subcommittee to use French ship, but he has had a stony wall with the carriers. In a meeting with Butler, airline representatives told him the idea just won't work and he might as well forget it.

In answer to Butler request for Civil Aeronautics Board action, Acting Chairman Joseph P. Adams told Sen. Butler the Board had the power, and that the rift is straining the water. He also said that in view of the difficulties involved in such a proceeding, the CAB can't at all concerned it should go ahead with it.

—Washington Staff



## Vacuum-melted alloys

### WORK LONGER with less "fatigue"

Vacuum-melted alloy steels in valve springs, bolts, landing gear—any part subject to cyclic stressing—far outperform conventional air-melted alloys. For vacuum-melted metals exhibit exceptional fatigue properties—even when heat treated to near maximum limits.

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## CAB Examiners Restrict Nonskied Role

**Possible certifications for irregulars hinted; special and charter flights would be authorized.**

By Cedric Lewis

A definite, restricted sphere of operation for unassociated airlines in routes needed in a report by two Civil Aeronautics Board examiners in the examinee's irregular air carrier case.

The examiner, Ralph L. Wiser and Richard A. Walsh, have written an important part which brings closer to reality the longest, longest case the CAB has ever processed. It has run 42 months and 50,000 pages of testimony.

The report doesn't open up any new horizons for the irregulars, although there is a hint at possible future re-examinations, but it does define specific duties and areas of operation. ► **New Classification**—Under the examiner's recommendations, irregulars would be classified "Large Supplemental Air Carriers." Two types of supplemental and char-

ter operations would be authorized:

- Charter Service would involve transportation of persons and property or placeholders' contract on a flight for the charterer's own account. A carrier could charter one half or more of an airplane's capacity to a charterer and could use the remainder to fill another charter of half or more of airplane capacity. No reduction of frequency or regularity would be applied.
- Special Service would involve general types of transportation, but would be subject to restrictions of those flights in each direction between any two points during a calendar month.

A three-hundred-day period is proposed for the supplemental authorizations, an adequate period to allow the examiner to develop this type of operation and give the CAB a period to review its success in dealing an irregulars' actions.

The report recommends an imme-

### CAB Authority

In reiterating these forms of service for irregulars, the examiners find that CAB does not have the power to issue regular certificates of public convenience and necessity for supplemental service. The stand it based on the finding that under the Civil Aeronautics Act, no certificates issue debar route and points to be served are strictly specify limits on operations such as those applying to supplemental service.

No such limitations are found in the Board's Foreign air power, however, and the proposed authorization would be limited to supplemental service.

The proposed regulations would not permit irregular operations of the North American Airlines type, but they would have little effect on the other operations conducted by the majority of irregular carriers. Currently, the industry does about 10% of its business in commercial charter and splits the rest between common carriage and military traffic.

### Background

Most irregular carriers engage in charter operations. Figures in the report show that the irregulars get nearly half the monthly revenue done by passenger carriers and make between 40 and 50 million dollars a year.

The Large Irregular Air Carrier Investigation was started in September 1951 as a general probe of the situation. Its purpose was to determine what role, if any, the irregulars should have in the nation's air transportation pattern. If a need for their services was found, the investigation was to assign them tasks, decide which applicants should conduct the services and define the regulations under which they would operate.

When all the issues and parties had been consolidated, the proceeding wound up with 68 applicants, 25 intervenors and CAB's Bureau of Air Operations participating, and with 200 applications involved.

► **Experimental Period**—A great variety of services were asked for by the applicants. The examiner concluded that

it would be in the public interest to authorize charter and special service transportation as a set of proposed rules and regulations under which the large supplemental Air Carriers would have to operate.

The report also meets 33 irregular exams which should get the new authority and 27 which should not.

At the end of 1953, evidence on the qualifications of half the 60 applicants had been taken. At that point, the CAB decided it had enough of a cross-section of the industry to issue a judgment on its place in air transportation and, in the interest of spending a decision, decided to stop taking evidence on individual carriers and concentrate on the general issues.

### Judgments

Wiser and Walsh made individual judgments on 60 carriers which were individually examined. Of these, 37 were found qualified and 33 unqualified for the proposed new authority.

On the remaining 30 applicants a "grandfather" standard was used. Those carriers which were operating in the last six months of 1954 were recommended for supplemental service authority. Those which didn't operate in that period were rejected.

In the final count of 27 carriers whose applications were found consistent with the public interest, the six operating companies—All American Airways, Carter Air Transport, Gemini Latin Airlines, Modern Air Transport, and the United Express Co.

## Conflict Develops in Congress On Handling Tacan-DME Dispute

► **New Entry Policy**—Included in the recommendations is a set of proposed rules and regulations under which the large supplemental Air Carriers would have to operate.

In dealing with the question of sorts of new air carriers into the certificate, the report comes up with a recommendation that the CAB adopt a policy as the issue. It is suggested that the policy should be that federal government be invited to consider expansion of the number of certificated carriers on a route when the volume of Large Supplemental Carrier traffic exceeds 10% of the certificated carrier traffic on the route for a substantial period.

Large Supplemental Carriers capable of the traffic could apply for and get a certificate as such, proceeding, if this route becomes too crowded.

► **Intergovernmental Arbitration**—It is recommended that the CAB conduct an informal investigation of costs services on transoceanic and west coast routes of American Airlines, Trans World Airlines, United Air Lines and Pan American World Airways in relation to aerial traffic.

The investigation would determine whether a formal CAB proceeding is justified to require the carriers to increase route service.

The irregular carriers don't happen with the findings of the examination. They consider the recommendations too restrictive, and will probably campaign for some modification of them when the CAB comes to make a final decision. Irregulars hope that congressional action will yield some type of service for them that will be more liberal than that advocated by the report.

### Settlement Bid

**North American Airlines**' latest move in its running fight with Civil Aeronautics Board is several in a long-time operating war was a proposal to the Board to settle the twosided disagreement.

CAB is considering an examiner's recommendation that the unclassified group be eliminated by vesting all of the Civil Aeronautics Act (AW Feb. 21, 1954).

North American's proposed settlement is very similar to one proposed by CAB a year ago. The Board again is asked to dismiss the unclassified and compliance proceeding, then North American carriers would surrender their letters of operation.

However, the unclassified group proposes to continue unclassified operations producing fuel division in fast pending certificate application cases. The other provides that no user that uses aircraft would be required, the unclassified now exceed.

From House and Senate and the members down along the committee on Appropriations, Armed Services, Commerce and Foreign Relations, it was further indicated to report an interim report as late as June 15, 1955, at which time a final report on Dec. 31, 1955, at which time the joint committee would file the bill. The joint committee would file the bill, and on a cost of \$13,500 would be authorized.

Observers predict speedy Senate action once the resolution clears the Senate Rules Committee. House expectations are that when the House refers it to its Rules Committee, the resolution will be passed quickly. ► **Hearing Near End**—In the meantime, the transportation subcommittee of the House Commerce Committee plans to wrap up its hearing phase of the Tacan-DME dispute. Final witness before chairman Don Munro's group is to be Mr. Kenneth C. Smith, general manager of the Arnold, Gossen & Feltz Assoc., an engineer of Tacan.

The House Commerce Committee perhaps has made the most extensive examination of any of the investigating committees and strongly feels the subject will soon find its just solution.

They don't profess to have complete technical knowledge, but are making heavy on the testimony of the many military and civilian experts who have appeared before them.

BIG GUS, Milton Arnold, Air Transport Association president, summed up the company's case for the committee with a challenging question: "Are the stated military requirements for Tacan valid?" The committee's witness, expected by

### Magnuson Plan Favors New Air Carriers

A new proposal showing the right of new entry into air transportation has been introduced by Sen. Warren Magnuson, Chairman of the Senate Interstate and Foreign Commerce Committee.

Both Magnuson and Chairman Fred Frost of the House Interstate and Foreign Commerce Committee have stated that the role of unassociated carriers will grow independently of hearings this session (AW Mar. 25, p. 54).

Magnuson's proposal calls for an amendment to an existing civil aviation bill which he said introduced, would do this:

\* First, modify the definition of policy in the 1954 Civil Aeronautics Act to emphasize the "competitive" goal of air transportation development.

Magnuson's proposal directs "the encouragement and development of a competitive air transportation system." \* It adds a provision that regulation shall "foster the growth of competitive economic conditions." (The 1954 act does not include a "competitive" and states only that regulation shall "foster sound economic conditions." . . .)

While the 1954 act provides for "competition to the extent necessary," Magnuson's proposal provides for "competition in the measure extent consistent with the economic development of the industry giving full recognition to the benefits derived from the certification of new competitive carriers in promoting the sound development of an air transportation system meeting the needs of the traveling public."

\* Second, the burden of proof would be shifted from the carrier to the Board in the event of a complaint. Magnuson's proposal directs the Board to issue certificates "unless it finds that the applicant is not fit, willing, and able to perform civil air transportation properly and to render to the public service to perform such transportation properly . . . or that the public convenience and necessity will not be served thereby."

Another amendment introduced by Magnuson would establish a centrally administered, reporting to the CAB chairman.

Rep. Carl Hatch: "We'll just have to assign the military on their word. How are we going to judge the validity of military requirements? By do or would be shifting a tremendous burden of responsibility."

Most Accept Borden-Cox. Arnold told the committee that the substantial amount of money required from the government to complete evaluation of DIME could be justified unless at the contractor's insistence. It is concluded that USG/DIME will meet the initial requirements.

At VOR-DIME will not satisfy the military. Gen. Arnold suggested we keep our classes to accept the economic and operational burden imposed by the transition to Taiwan in the interest of a common system.

The committee expressed great interest in the fact the scheduled airlines had not purchased airborne DIME sets despite their production and availability. Gen. Arnold said ATA had invited its member airlines more than five years ago to buy DIME because the Taiwan conflict was deemed less than Cox. Arnold said he had personally phoned with the Bureau of Budget at least in 1952 not to seek apportionment for CAA administration of DIME in view of the mounting cost.

Aviation Week said—The ATA could tell Rep. Hatch that it did not have responsibilities to your airline partners purchases of DIME, and the administration as the dispute was in public. He referred to an article in Aviation Week, Dec. 7, 1951, which Chairman Harric outlined included in the record.

When Gen. Arnold told the committee that ATA carriers would not be damaged by abandonment of civil DIME the concern shifted to possible compensation for the profit corporate flyers who have bought the issue off said. No remedial solution was forthcoming but such a proposal for compensation in purchases of good faith is being considered in an attempt to avoid dropping DIME.

DIME supporters, however, hope to reduce and curtail the use of DIME while the development of Taiwan proceeds. A major effort is being made to sell the military a compromise in the form of the Air Coordinating Committee. The Navy Panel is reviewing the ANDB-Taiwan decision for ACC with a report due April 30.

Rep. Harric' committee might take the initiative. The group has explored the DIME question from all angles, having the final witness. Their exploration included a Navy flight division director of Taiwan. "This was an admirable performance," Rep. Harric reported after a flight which included inspection of the Navy Taiwan ground installation at Atlantic City, N.J.

## Hoover Group Report Asks Single Military Air Transportation System

Refers to a single military Air Transport Service, under one of commercial carriers and a cut in the number of all military aircraft operated by the three military services, was again tendered to Congress this week by the Hoover Commission.

Criticizing the growth of "Empire Building," by air transport services such as the Navy's Fleet Logistic Air Wings, Air Materiel Command's Log Air and the vast fleet of military transport planes attached to various base commands, the commission suggested that the Defense Department set up a Director of Transportation to supersede all transports.

**ATA Alert**—In a study of the MATS operation, the commission found that its route paralleled those of the domestic and international airlines in all but a few instances such as in the Arctic and northern Canada. In 1954 MATS operates 516 planes, 42% of them in the 44-passenger category. The total cost of MATS in 1954 was \$181,000,000, up from \$46,400,000 in 1953 and \$60,700,000 in 1952.

MATS personnel has grown from 46,297 in 1951 to 103,205 last June 31. In fiscal 1954 it carried 1,831,000 domestic and 942,000 international passengers.

In a sharp attack on the economics of the MATS operation, the committee laid off expenses to the extent of money paid net by the government.

## Recommendations

Hoover Commission proposes the following changes in reference to air transportation:

■ That the technical services of MATS which duplicate those of other branches of the government be discontinued.

■ That the Secretary of Defense assume responsibility and controlling direction to eliminate the duplicating air transport service within the Department of Defense and merge the entire operation in MATS, except necessary alternative services.

■ That the number of administrative aircraft be drastically reduced.

■ That the present operations of the integrated MATS be restricted and restrictedly limited to persons and cargo usually evaluated as necessary for military air transportation and, only after commercial carriers have been utilized to the maximum practicable extent, should transportation on services carriers be authorized.

In a look at another USAF operation, the committee is critical of the Air Materiel Command LogAir flights, due largely to duplicate aircraft parts and accounts.

The report notes that flight fees,

publications, drawings, technical publications, aircraft equipment, annual maintenance, lumber and laundry equipment help to swell the cargo.

The report notes MATS carried 2,180 tons of cargo to Japan in last year and that most if not all of its operations can be carried out by MATS.

In the field of administrative flying, the committee's task force estimated that Defense Department costs operating under various commands totaled \$355,000 passenger between various fields in 1954.

## Operations

Other observations on Defense Department air transport operations:

■ In 1954 the department generated about 8 million air passengers, of whom 6.8 million were held onboard in "free seats."

■ MATS provides technical assistance of communications, weather information, air rescue and antiaircraft chief production for diagnostic those of third government agencies.

■ There is a great deal of MATS "dead-

heading" but the report is trying to cut down on this by selection of bases.

The Hoover Commission, leaves death at the Commission on Organization of the Executive Branch of the Government, even all forms of transport aviation in 10 weeks to Congress. Defense Department gets the main share of attention, but only in reference to its route, base sites, terminals, scheduling, fuel and water carrier operations.

■ **General Criticism**—Overall criticism of Defense Department transportation functions, summarized in a package to the recommendation that it be controlled by a single director, includes these points:

■ Lack of integration of the key components of transportation.

■ Failure to coordinate scheduling and procurement with transportation within and between the services.

■ Present organization plus subordinates transportation.

■ Lack of review and improvement of operating performance.

■ Wide and uncoordinated diffusion of functional functions.

■ Too much authority central.

■ Inadequately trained personnel.

■ Lack of statistical and management control data.

■ Poor policies for traffic management personnel.

## Lockheed Gives Up Turboproped Connie

Lockheed Aircraft Corp. has scrapped the turboprop 1449 Super Constellation. In its place, the company plans to offer instead its new Model 1449, powered by the 4,400-hp Wright Turbo Compound engine, originally.

A production of the 1449, however, may be held for the military. Lockheed spokesman said the Navy is interested in its Model 1449, a stretched version of the 1449 with Pratt & Whitney Aircraft's T34 turboprops.

TWA withdraws its engine from the civil transport when Lockheed lengthened the 1449's fuselage 105 inches after purchase and space studies indicated the turboprop Super Connie could carry a heavier load than could be achieved under average densities. The longer version became the 1559.

Pratt & Whitney said Lockheed wanted to pull two engines rated power out of the T34 for the new model.

With no turboprop fan in civil aircraft, Lockheed sold the extra 105 inches out of the Super Connie's fuselage and replaced the T34s with Wright's latest turbo-compound B330-B411.



Navy Uses Flying Lab for Radar Studies

Navy's new Flying radar lab, an RDR mounted on four wing-pod mounted radar sets, will be used for Naval Research Lab studies of radar and radio wave propagation. Piloted with nosewheel, which can be raised and lowered in flight, leaves meteorological instruments. Radar sets, which range 5 to 15 miles, will be used

to investigate backscattering properties of different targets. Aircraft will be used also as test vehicles of a one-way transmission link to investigate atmospheric scattering and "radio ducts." The latter is an atmospheric condition which provides unusually good radio transmission.

# Air Defense Trying Out Missiles Armed With Atomic Warheads

U.S. Air Force and the Atomic Energy Commission are experimenting with atomic warheads for surface-to-air and ground-to-air guided missiles, as agreed to protect the country against enemy bombers.

First test will be held during coming disbursements at Nevada, utilizing an anti-air missile. The weapon was not identified by AEC, but presumably would be the Douglas Falcon or Douglas Sparrow, equipped with some atomic device.

► **Downed Bomber**—As a participant, a two-tonne device was dropped from a B-52 bomber at 35,000 ft altitude onto a pattern of rods left by 40 fighter planes. It was assumed by observers that the pattern simulated the flight paths of an enemy bomber fleet.

energy attack. The employment of such weapons for air defense purposes will enhance the effectiveness of other capture aircraft squadrons and ground-based defense units in stopping or may burn down short of our cities and other strategic targets."

Major advantage of an atomic attack at high altitude is that a direct hit is not necessary. Tremendous heat and blast of an atomic explosion would disintegrate any plane in the area.

No solution has been given of the use of the atomic bomb without the ICBM, in my opinion, it would give us terrible weapons to destroy any squadron of bombers flying at maximum without endangering the interceptor which launched the missile.

First operational interceptor to be faced with the Falcons will be the No. (now F) 981, expected to go into operation at northern outposts in the Alaskan and Northern Air Commands (AVW Mar. 21, p. 10).

Atomic bomb replacements should have been installed around several defense bases. So far, the missile has been armed with conventional warheads.

The Defense Department goes moreover that a high blower would not result in dangerous radiation on the ground

area of the initial production contract and adds:

"While it is in the government's interest to reward such producers to a de-escalation contractor, price advantages alone should not be allowed to dictate an award decision, unless a bid and reasonable offer cannot be negotiated with the development contractor in a timely manner. The price advantage must be taken into account in determining the effect factors involved."

In industry reaction to the new directive generally was favorable. It was viewed as an effort to protect the development contractor and take full advantage of his know-how, which is difficult to pass on when another firm is chosen for production of a weapons system.

## RAF Ordering Gnats, Carrier Model Offered

(McGraw-Hill World News)

London—With the Royal Air Force determined to "give the Gnat a try," negotiations now are under way between Britain's Ministry of Supply and Folland Aircraft Ltd., to have more high-weight fighters to take Tornado combat a development batch of about 12 aircraft.

RAF's approval of the Gnat came shortly after Undersecretary for Air George Ward and the Minister had no interest in the small plane.

► **Potential Customers**—RAF's order should help Folland in its efforts to sell the Gnat to other countries. Two potential customers are the Indian Air Force and Royal Canadian Navy.

W. F. W. Petrie, chief designer, and Group Capt. S. D. Taylor left for India recently to discuss the Gnat. Folland's high-performance Gnat does not have a clear lead in India. Dassault of France also is bidding for IAF's order with its entry in the North Atlantic Treaty organization's lightweight fighter competition.

In Canada, RCAF has started a design study of a carrier-based version of the Gnat. Work also is proceeding on finding how much existing gear would have to be altered should aircraft for the RCAF be built.

► **Production Models**—Two production Gnats, powered by Bristol Aeroplane Co.'s Centaurus engine, are under construction. They were expected to roll out in time for the Society of British Aircraft Constructors' flying display this year at Farnborough.

Positive Major, powered by a 1,640-lb thrust Armstrong Siddeley Vc jet, appeared in the show last year.

With the 4,500-lb thrust Orpheus jet in afterburner, Folland's Gnat is expected to reach speeds up to Mach 1.2.

AVIATION WEEK, April 4, 1953

# USAF Seeks More Efficient Management

A dual-pronged effort to put U.S. Air Force on an efficient business basis must advance if its type in U.S. military history, a leader says, is at the office of Lt. Gen. Charles H. Stone, 3d Deputy Chief of Staff (Comptroller).

The program is patterned after systems used successfully in industry, consisting of two main parts:

- A financial audit board on every team and composite expedition. It will be used to cut costs and improve budgetary planning.

► **USAF Executive Development Program**—is a training course, a series of lectures by both military and outside business executives, all related to the comptroller's problems and financial management. Classes ranging from \$5 to \$6 key personnel are taking part in the program.

General Stone sees little difference between the professional USAF pilot and other officers who are concerned with management and bookkeeping chores of the military organization.

► **Planning Work**—"Innovation," he told Aviation Week, "but to avoid being too radical, we must keep the cost of doing things from going to traditional military operations."

- A checklist that will classify the best practices in the poor products and services where improvement must be made.
- Encouragement of scheduling and programming of work to avoid free peaks and valley common to most military operations.

- Cost accounting will permit direction of more resources into support areas to the mission itself.
- Fewer and wider sample repeats to reduce the administrative load.
- More stringent procurement.

General Stone feels strongly that the program of putting a price on every



LT. GEN. STONE

accomplishes a mission. That is made possible in reducing them all to a common denominator—the dollar.

- An accurate measure of the cost of accomplishing the mission. That is something foreign to traditional military operations.

- A checklist that will classify the best practices in the poor products and services where improvement must be made.

- Encouragement of scheduling and programming of work to avoid free peaks and valley common to most military operations.

- Cost accounting will permit direction of more resources into support areas to the mission itself.

- Fewer and wider sample repeats to reduce the administrative load.

- More stringent procurement.

General Stone feels strongly that the program of putting a price on every

thing a USAF command does and every mission it performs will reduce waste.

► **Budget Improvement**—Former military liaison, General Stone points out, shows him emphatic obligations and disbursements. Under the new USAF system, there is put on records and regular review, the record to show who spent money and supplies and for what purpose.

Under the Financial Management System each USAF base will prepare budget, showing what is on hand and what is needed to do the job.

Adapting the Financial Management System, General Stone says, is a good deal like the conversion to a new weapons system. Professional writers have been engaged to show how real business methods can be utilized in a USAF military operation.

► **Education Programs**—First tests were conducted at McChord AFB, Wash., Lockbourne AFB, Ohio, and Langley AFB, Va., and others now are being tested at USAF headquarters.

Handed over with this program to the Air Force on a professional basis, the comptroller's office is conducting an educational program to improve officer entrepreneurship.

General Stone believes that the use of other people's money cannot be entrusted to contractors who fail to understand what lies ahead or trying to do to cut expenses and improve efficiency.

Because 90% of USAF's resources are used at base level, he feels it is vital that the men who are responsible for administrators know as much as possible about both USAF and business accounting methods.

## Estimate of Aviation Gasoline Consumption 1954-1960

(IN THOUSANDS OF BARRELS PER DAY)

	1954*	1955	1956	1957	1958	1959	1960
U.S. Military Jet Fuels	417	514	580	620	684	709	724
U.S. Military Aviation Gasoline	318	334	349	331	397	392	386
U.S. Civilian Aviation Gasoline	74	78	83	86	92	93	95
Total Exports of U.S. Aviation Gasoline	84	92	95	100	102	105	106
Total Military Consumption of All Types of Aviation Fuels							
Total Consumption of Aviation Gasoline (including jet fuels)	235	266	289	314	363	373	383
Total Consumption of Aviation Fuels (all categories)	296	326	347	377	427	437	447
* January-June data estimated. Source: American Petroleum Institute. Figures obtained by API from Petroleum Logistics Division, Office of the National Bureau of Economic							

## Buying Directive Protects Weapon Developers

New protection for the weapon system development contractor is accepted as a sound Defense Department directive ordering that price advertising alone is not the standard under which production contracts will be awarded.

The directive No. 6185.23, signed by Defense Secretary Charles E. Wilson, generally was interpreted as justification for a procurement officer to refuse a competitor's bid if the offer of open bidding shows such a step will serve the "best interests of the government."

► **Early Consideration**—Putting a cost that ranks items in books, rating, graded numbers, amounts and ranks, through complex development, evaluation and initial production, the directive says the department must keep itself free to pick the best production deal.

Factions which may have a bearing on this include:

- The development contractor can be best equipped to advise results of his work in actual production because he developed equipment and methods in the process or because it would take substantial time and money to pass on

AVIATION WEEK, April 4, 1953

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# Republic, Fairchild Profit Rates Higher

Aerospace reports for 1954 have been issued by Republic Aviation Corp., Fairchild Engine & Airplane Corp., Textron Aircraft Corp., and Jack & Ehrhart, Inc., component manufacturers.

## Republic

Republic Aviation Corp., Farmingdale, L. I., New York, reported net earnings of \$407,531 in sales of \$123,464,601 compared with \$384,531 on sales of \$111,881 in 1953.

End of the excess profit tax was credited by President Moultrie L. Peale as chiefly responsible for the higher rate of earnings to sales. In 1954 these amounted to 36.71 per cent after a 10% stock dividend granted last December.

At the close of 1954 the company's backlog was \$350 million, down from the previous year's \$1 billion.

► **Engines.** Problems incurred in the backlog are reflected orders for the FH-119, the F-105 and the experimental XB-805. Later plans are nearing flight stage along with the XB-810.

Peale said that 1954 production difficulties with the F-84 were the last problem involving development of the Curtis Wright version of the Super Sabre jet engine which resulted in aircraft being held up to the point where production had to be halted and 7,000 employees were released. He said major difficulties are passed and operations are now normal.

Other highlights from the Republic report:

- About 424,000 sq. ft. of space will be added in 1955 with acquisition of a Fairchild Engine & Airplane Corp. plant at Farmingdale.

- The General Motors Division of Republic has moved from a preliminary design and study phase into research and development activity. Two production contracts were awarded in 1954. New contracts and joint ventures, partnerships and weapons design and analysis are being prepared. New equipment is being installed for production of proto-type.

## Fairchild

Fairchild Engine & Airplane Corp., Hagerstown, Md., reported net earnings of \$4,134,015 in 1954 compared with \$4,013,561 the previous year. Sales were \$148,238,300, down from \$170,175,166 in 1953.

Other highlights from the report:

- About \$2,700,000 was invested in expanded research and development programs during the year.
- Two new divisions were added—Ki-

netes and American Helicopter Co. Both are concentrating on advanced designs under cancellation of the XB-105 jet fighter project and widening its interests to cover new manufacturing processes. These include a metallurgical development for applications to aircraft and missile, subject to thermal barrier problems and stainless steel heatshields.

New units of the Tucson Division at Deer Park, Texas, should be in operation by fall. It will provide 400,000 sq. ft. of space.

- Production of the C-139 will commence through 1955, placing out in C-138B production increases.

- Windtunnel tests will be started soon on a new air transport design and the prototype may fly by spring of 1957.

- \$1 million expenditure has been authorized for work on boundary layer control.

- Work is progressing on moisture insulation and trials will start that year.

- General Motors Division has added 40% to its personnel and production in cutting contracts will total 1956.

The division has designed a new type of propeller system.

- Unfilled orders at end of 1954 totalled \$286 million, down from \$312 million.

## Textron

Record net earnings of \$2,337,249 were reported in 1954 by Textron Aircraft Corp., Bellmawr, N. J., resulting in large part to the company's effective program of diversification.

The year's earnings, equal to \$1.25 a share, marked a 10.1% increase over 1953, the previous record year. Gross sales for 1954 were \$38,389,419, compared to \$37,130,911 for 1953. The difference was due, according to President Robert McGehee, to \$15 million in transitory claims in 1953.

## Automatic Carrier Landing

Naval aviators will begin flight operational tests on a new landing system capable of landing aircraft aboard carrier for landfall landings.

Developed by Bell Aircraft Corp. (AW Dec. 27, p. 46), the Automatic Carrier Landing System has completed trials at a Nimitz facility under weather conditions that normally would ground fleet aircraft.

Bell says the accuracy of its new system is also said to be well in at all weather landing of the older military and civil aircraft.

ACLS is a combination陀螺仪 and, according to Bell, Kadar locates the aircraft and determines its altitude and position in relation to the carrier deck.

An electronic computer indicates speed and direction, computes the plane's position with what it should be and determines the necessary course. This information is fed into a color television, which displays the aircraft onto the flight pattern.

The controller also indicates the speed of the aircraft carrier, its position and pitch and roll of the deck at the instant the plane will touch down.

If the landing approach is wrong, full stop, the device will give the plane a wide or end and it would not make a try.

While production was devoted in large part to major components for aircraft built by Boeing, Lockheed, McDonnell and Republic, Textron's engineering division was assigned on a weapons systems basis. The company expects new stakes in the field of electronics, aircraft design and utilization of new materials.

## Jack & Maitz

Jack & Maitz, Inc., Cleveland, Ohio, aircraft component manufacturers, had a net income after taxes of \$1,503,460 in 1954, larger than the company's history except for 1951.

Last year's sales were \$33,861,866, down from the 1953 figure of \$40,128,237. The fact that earnings increased by 29% in the face of this cut in sales was attributed to the end of the excess profits tax.

Jack & Maitz building at the end of the year was estimated at \$25 million, enough to keep the firm busy for 9 months.

The annual report pointed out that research and development expenditures last year came to \$3,718,000. Because of the nature of jack and mast unit powerplants, it is expected that the company will increase in 1955.

"More and more the developments which we must undertake are for highly improved drives for specific applications to a particular plane or guided missile, rather than for less specialized products having wide application in many end-use areas," the report said.

"This is the nature of the business as it is today and dividends will be in view of the increasing complexity of the electric component of the air plane. Many of these developments are such that 3 to 5 years are required for their successful completion."

## Automatic Carrier Landing

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An electronic computer indicates speed and direction, computes the plane's position with what it should be and determines the necessary course. This information is fed into a color television, which displays the aircraft onto the flight pattern.

The controller also indicates the speed of the aircraft carrier, its position and pitch and roll of the deck at the instant the plane will touch down.

If the landing approach is wrong, full stop, the device will give the plane a wide or end and it would not make a try.

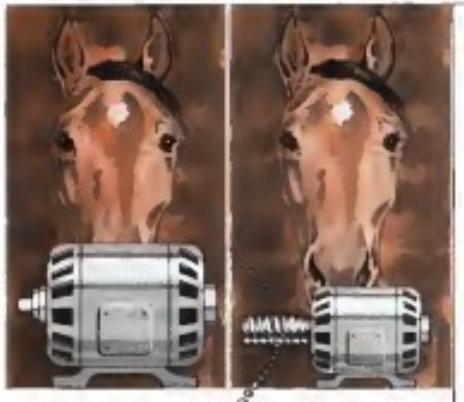


From Orenda's design, development and production departments came the first all-Canadian jet engine to power the CF-100 and F-86 Sabre V and VI. Expanded research facilities are now under construction as deal with the increasingly complex requirements of the future.

The 6,000 people in the Orenda family are dedicated to designing, manufacturing, maintaining and servicing modern jet engines and other forms of aero power and to the building of a sound aircraft industry for the defence and development of Canada.

\*Orenda. Source of all present designs.





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## Cleveland Pneumatic Products Now at Work on Aircraft



Flight control actuators used on the Grumman F9F-5N Cougar, consists of a ball screw driven by a 14-H.P. hydraulic motor, with the nut driven by a 4-H.P. dc-servo motor. Peak operating load is 12,000 lbs.



This ball screw mechanism 387" long extends and retracts the nose wheel on the Grumman 223N Intruder. Powered by an 8-horsepower motor, it operates at torque loads of 4200 to 5000 pounds.



Designed to be flight tested without trimmings from three components, this C-224 landing gear strut cylinder is available with ball bearing or Cleveland Pneumatic's 1,000,000 pound spring. A 4,000,000 volt acetylene welding machine.



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## Capital Traffic Cure Stirs Fight

Proposed changes for relief of the air traffic jam at Washington National Airport, issued by a Presidential Ad Hoc Committee, include use of both airport's Friendship International Airport, but leave the long-term problem unsolved.

Last year, President Eisenhower appointed a committee composed of Steven R. Hughes, Budget Bureau Director; Stanley Washin, Secretary of Commerce, and Howard E. Talbot, Secretary of the Air Force, to make recommendations.

The committee's report finds that:

- The government should expand facilities at National Airport and take suitable steps to relieve congestion.
- Friendship should be used to supplement National Airport.
- Local citizens should decide on a solution and get together with the airlines and the government for joint planning.

The airlines end up here for an immediate permanent solution.

- **Basis Project.**—The need for a second runway for Washington has been obvious for a long time. Several years ago the government started negotiations for a field at Burke, Va., south of Washington. Local pressure and a determined campaign by Maryland groups in favor of Frederick just about killed the Burke project.

Use of Friendship has been a main point in the controversy. Maryland congressional leaders feel that the field is close enough to be feasible as an alternate terminal. Local groups and the airlines don't think so, and strong objection to the committee's recommendations have arisen.

Airlines feel Washington is, to a large extent, a short haul carrier. They believe the extra time consumed in getting to and from Washington will detract from the importance of the airport.

**Burke**—Admiral Arthur—Maryland leaders say that long-haul traffic could be diverted to Friendship with little trouble since passengers on such flights are not particularly concerned with a little added travel time.

Sen. John M. Butler has asked the Civil Aeronautics Board to take formal action to designate Baltimore as alternate terminal for Washington.

Friendship Airport never has operated at anything close to capacity. It is considered a model field from an operational standpoint, which might just be why it simply isn't convenient enough to serve Washington.

**Hindrance, Not Help.**—The committee's recommendation that local groups get together with the airlines and the government in constructing a new Washington airport is viewed in the

opposite as more of a hindrance than a help. The project would involve agreement between Virginia, Maryland and the District of Columbia as well as financing and other factors. Passage of early agreements is considered remote.

According to the committee, the air port should be financed "in the same manner as in all other critical airfield construction in the continental United States"—i.e., by the affected congressional districts and the air transport industry. Spread factors in the Washington situation complicate this concept.

The District of Columbia has no vote, and thus little opportunity to expand its operations and make its services fit. Any funds to be spent by the D.C. government must be approved by Congress. So the District of Columbia isn't able to manage its own local build airports as independently as other municipalities.

**Lack of Funds**—The crux of the case made by the committee appears to be that there are currently no federal funds available to build a second Washington airport. The relevant official will be helpful, but they don't know on the second issue of where and when the second project will be built.

Viacon stages are recommended for each of the major airports, with local community committees, with minor planning and leading, fastest building rate and biggest pay load per gross weight of any transport plane.

**Freight Transport**—Problems of the

The import bills for expansion of gate positions, parking, baggage handling, fueling and other facilities, improvement of runway and heavier lighting and an additional hangar.

**Other Alternatives**—At National:

- About operations at neighboring Beltsville Air and Associate Naval Air Station to relieve airport conditions during peak hours.
- Better use of all government traffic but that of the highest rank and urgency.

- Developing long-range plans to determine the feasibility of relocating all Beltsville and Associate aviation.
- Doing away with a high density control zone in the Washington terminal area.
- Improve cooperation of all federal bodies of government with civil aviation in every way possible without impairment of essential military and vital governmental operations.

## New Ford Tri-Motor Nearing Completion

**Belleville**, Colo.—Prototype of a much-needed Ford Tri-Motor is nearing completion at Hayden Aircraft Corp., organized here to build a new version of the classic old aircraft transport. The new model will be called the Short Huskie.

Designers claim the plane, intended for both cargo and passengers, will have shorter takeoff and landing distance, faster climbing rate and biggest pay load per gross weight of any transport plane.

**Frigid Transport**—Problems of the

## Military Aviation Obligations

Contract cancellation for aircraft not related procurement received new orders during January with the result that the three military services had over \$120 million more on hand in unobligated funds at the end of the month than at the beginning.

### NET OBLIGATIONS

(In thousands)

	January Obligation	Unobligated Balance Feb. 1
<b>Aircraft</b>		
Air Force	22,046	\$1,183,169
Navy	-140,077	1,285,079
Army	1,727	216,001
<b>Total</b>	-121,376	6,481,001
<b>Ground Materiel</b>		
Air Force	105,177	478,013
Navy	14,676	115,199
Army	21,023	107,015
<b>Total</b>	139,876	710,648
<b>Electronics and Communication Equipment</b>		
Air Force	29,058	673,375
Navy	2,958	96,864
Army	5,941	102,199
<b>Total</b>	37,957	811,338



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test patterns earlier now, one between Kelly and Tinker AFB, Okla., the other between Kelly and Andrews AFB, Md. Separation has 21 officers and 160 men.

► **New Skop-South** reported that Doug Las have tested on 78 hr of Phase I testing with the YC-121B, and the plane should soon be ready for Phase II.

In December, MATS hopes to get its two Lockheed YC-121T Super Constrees and two Boeing YC-97Js, each powered by four Pratt & Whitney T4 turbo-prop engines. South expects the service to gain a valuable experience with the turbo-prop, against the day that the Douglas C-133 transport transport comes into service. For cargo transport, South favors the cargoplane configuration he says, the advantage being the shorter delivery time interval. For passenger service, he favors the jet transport.

► **Radiation**—MATS' activation and conversion program has been running at high gear for the last year and will continue for the next 18 months. Eighteen transport squadrons have been reorganized or converted since the program began, and 100 more transports have been absorbed in the 1,300 plane fleet.

Since the move of headquarters to McGuire AFB, N.J., from Westover AFB, MATS has concentrated at the new headquarters probably the largest fleet of transport transports ever assembled at one location.

### CAB to Air Inspection Proposal at Meeting

Civil Aeromarines Board's proposal of annual inspection of general aircraft will be presented before a public meeting in Washington April 13.

The Board's purpose in suggesting the regulation is to place more responsibility on operators for the condition and worthiness of such aircraft.

CAB said its action in setting up a meeting under the Bureau of Safety Regulation is a response to numerous requests for a public discussion of planned changes in procedure. After the proposal was announced Dec. 30, general aviation operators indicated acceptance of the Board's objective but raised opposition to certain requirements.

As a compromise, CAB suggested the open meeting be limited to discussion of the nature of disqualification, which is

► **Pre-flight inspection**—The mandatory 100-hr inspection proposal may be made more flexible. An alternative would be periodic inspection at times consistent with type of operation but with a maximum of one year.

► **Progressive inspection**—Retention of progressive inspection in certificate of airworthiness could be liberalized. An alternate proposal would be to permit progressive inspection elsewhere.

► **Mechanics' proficiency**. Proposed regulation would require an airframe mechanic to make a minimum of 200 aircraft inspections a month. Other items will be discussed to insure a mechanic's continuing proficiency.

### Colombia Civil Fleet Up 30% in Year

(McGraw-Hill World News)

Bogota—The number of commercial planes registered in Colombia for 1964 had increased 30% to 356, from 273 in a registration of 256.

During those additional transports,

large improvements in December were in Harry Avianca had to charter two Pan American DC-9s during the month. The Civil Aeromarines Board of Colombia has already authorized the import of 48 more planes.

Other new developments:

- Lloyd Aereo Colombiano, a new airline, started operations Dec. 30.
- First commercial helicopter company in Colombia started operations. Petrel can Bell Co.

- Extensive pilot training program is being started by the Civil Aeromarines Board. Cost is \$2,800 a pilot.
- Training school for cockpit pilots and gliders will be opened this year.

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## Bell Aims Copter at Ore Hunters



**UTILITY COPTER** is being used by Bell to test out mining landing techniques.

To prove the business value of its utility helicopter as a tool for timber harvesting, wiredriving, surveying, geopersonal and to expand its market, Bell Aircraft Corp. has established the Bell Helicopter Test and Development Corp. The five salesmen will:

- Field-test a variety of non-interferable mechanical and scientific equipment used in modern uranium exploration.
- Develop, simulate and compute any references uncovered during actual operation that will broaden the effectiveness of the basic Model 47 design.

Bell is paying the costs of proving the helocopter equipment from became the first believe that such research is often spread beyond the reach of individual potential customers and the manufacturer must assume this cost in developing his market.

Henry Cybord, vice president of the parent company's Helicopter Division, is present and Arthur E. Purnell is general manager of the wire group. Officers are at Ft. Worth, Tex., and Glendale, Calif.

"We are field-testing the helocopter and special equipment modifications in order to determine exactly what is needed by the fast growing miners in dairy," Cybord explains. "Based on our experiences in five field," he states, "we will be able to determine and produce a helocopter of enhanced ability for uranium prospecting and production and for the many commercial helicopter operators using our machines."

**Prospector** checks northwestern graph showing after right away flight



**PROSPECTOR** checks northwestern graph showing after right away flight

hour-long surface trips to half a day, using coyotes. Important ore samples and subsurface readings can be checked at field sites within hours and appropriate action taken quickly. Also, the copters can get men and materials quickly to the scene of an emergency.

▪ **Repete Ventures**-Bell presently has appointed a subsidiary to prove the value of the helicopter in logging and develop a potential market. One was negotiated to study the owner's potentialities in petroleum geological surveys shortly after the model 47 received its Type Certificate in 1946.

After testing the petroleum potential on the copter, the company devised the subsidiary. There are now more than a dozen helicopter charter operators leasing Bell machines to oil companies all over the world and two oil companies also own 47Cs, the firm says.

### Automatic Off-Course Navaid for Learstar

First business plane to incorporate an automatic off-course navigation system built into an autopilot has been sold by Lear Aircraft Engineering Division to British Aerospace Ltd Co., Ltd., Toronto, Canada. The installation is the first purchased by any commercial operator.

The new integrated Collins Radio NC-101 off-course computer and Lear 2.5 autopilot enables the Learstar to be flown automatically to any offcourse destination as waypoint within range of two VOR stations. System also provides the crew with information on the distance to the destination or waypoint without need for DME equipment.

Added features of the Learstar system is a ground-based device which automatically routes the VOR receiver to selected stations en route and transmits required data to the navigation computer (AW Dec. 13, 1952, p. 41).

Certified in the airline transport category, the Learstar is a twin-engine Lockheed Lodestar, seating up to 12 passengers plus a crew of two. Lear reports that the aircraft will fly two to three times as well. Among those who have placed orders are Chance Vought Aircraft Inc., Johnson & Johnson, Burroughs Corp., and Charles B. Wrightsman.

### Lightplane Exports

February exports of U. S. all-places weighing 4,000 lb. and less totalled 43 with values of \$181,571, Aircraft Industries Assn. reported recently.

The latest total through Jan. 30 the number of planes exported in the first two months of 1953. Value of these shipments was \$85,950.

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TODAY! Refer to Dept. 102.



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**CANNON ELECTRIC**

Co. Acquisition of 1,300 common  
shares by H. F. Deyo, officer, making  
a holding of 2,000, disposal of 603 com-  
mon shares, total holding, by Charles  
B. Sneed, officer and director.

Northwest Airlines. Acquisition of  
300 common shares by Morton H. Fay,  
director, making a holding of 500, ac-  
quisition of 1,000 common shares, total  
holding, by Alphonse Petrus, director,  
acquisition of 400 common shares by  
Whitlock Whitney through Whitney  
Corp., making a holding of 1,500.

Northwest Aircraft. Disposal of 13,  
600 common shares by Wallace C. Col-  
lins, director, leaving a holding of 6,400,  
disposal of 4,600 common shares by  
John W. Myers, officer and director,  
leaving a holding of 3,000, acquisition  
of 200 common shares by John O'Malley,  
director, making a holding of 321, dis-  
posal of 1,704 common shares by  
R. J. Pagan, officer and director, making  
a holding of 1,432.

Pacific Northwest Airlines. Acqui-  
sition and disposal of 200 common shares  
by M. R. Townsend, officer, making a  
holding of 25,713, acquisition of 300  
common shares by M. B. Kirkpatrick,  
director, making a holding of 2,000,  
acquisition of 1,500 common shares by  
Howard A. Olson, officer, making a  
holding of 7,600, disposal of 500 com-  
mon shares, total holding, by Paul Pen-  
selt, director.

Pan American World Airways. Ac-  
quisition of 200 common shares as com-  
pensation and disposal of 473 shares by  
Alvin P. Adams, officer, making a hold-  
ing of 109, and three resignations as  
compensation, 112 common by Henry  
H. Besig, officer, making a holding of 1,005,  
171 common by R. G. Ferguson,  
officer, making a holding of 993, 208  
by Franklin Gladhill, officer and direc-  
tor, making a holding of 1,752, 206  
common by William E. Morrison, offi-  
cer, making a holding of 10,361, 171  
common by Clarence M. Young, offi-  
cer, making a holding of 10,361.

The Pan. Disposal of 1,000 com-  
mon shares by Thomas A. Kennedy, offi-  
cer and director, leaving a holding of  
10,361.

Radios Corporation of America. Ac-  
quisition of 100 common shares, total  
holding, by Walter Baldwin Smith, di-  
rector.

Rathbone Manufacturing Co. Dis-  
posal of 50 common shares by Carl J.  
Gillert, director, leaving a holding of  
1,000, acquisition of 2,200 common  
shares by Percy L. Spence, officer,  
making a holding of 3,100, disposal of  
163 preferred shares, total holding, by  
Paul F. Hansen, officer.

Reynolds Metal Co. Acquisition of  
281 common shares by Calvin E. Cop-  
pock, officer, making a holding of 1,546.

Rheon Manufacturing Co. Disposal of  
700 common shares L. W. Etman, offi-

cer, leaving a holding of 300, disposal  
of 7,108 common shares by D. L.  
Rivers, officer and director, leaving a  
holding of 86,900, disposal of 100 com-  
mon shares by J. P. West, officer, leav-  
ing a holding of 19.

Seaboard and Western Airlines. Dis-  
posal of 500 common shares by Douglas  
M. Ansley, director, leaving a holding of  
6,916, disposal of 1,859 jointly held  
common shares by Wallace P. Neff,  
officer and director, leaving 27,530  
jointly held shares, disposal of 2,530  
common shares by Arthur V. Norden,  
officer and director, leaving a holding  
of 20,121.

Sokol Aircraft Co. Total holding by Max-  
well F. Shady, officer and director.

Spry Corp. Disposal of 1,930 com-  
mon shares by Thomas B. Dog, director,  
leaving a holding of 6,081, acquisition  
of 1,704 common shares by Weston R.  
Bosch, officer, making a holding of  
15,272, disposal of 100 and acquisition  
of 500 common shares by Lindsey Hopkins,  
director, making a holding of 14,  
359, disposal of 7,930 common shares  
by H. T. Vukars, officer, leaving a hold-  
ing of 18,880.

United Air Lines. Disposal of 100  
common shares by H. W. Ireland, offi-  
cer, leaving a holding of 495.

United Airlines Co. Disposal of  
900 common shares by El Merle  
Horner, president and director, leaving  
a holding of 3,000, disposal of 300  
common shares by William B. Robbins,  
officer and director, leaving a holding  
of 2,500.

Western Air Lines. Acquisition of  
1,000 capital shares through exercise of  
an option by Terrell C. Deakowski, offi-  
cer and director, leaving a holding of  
5,000.



**PAA Streamlines DC-3**

New nose wheel does on the Douglas  
DC-3 increase the plane's cruise speed 30  
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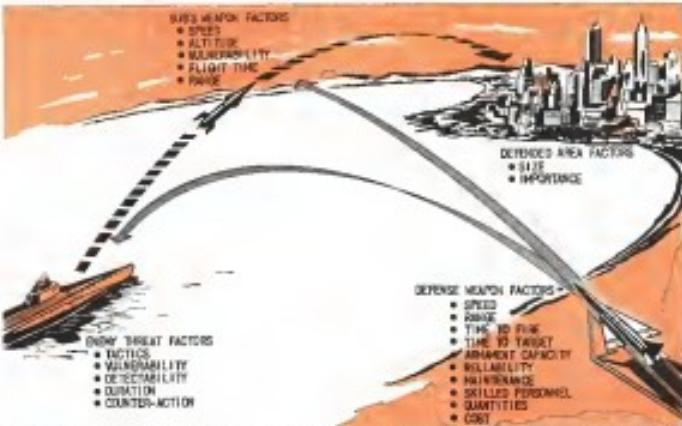
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# AERONAUTICAL ENGINEERING



## How an Air Weapon System Is Evolved

By Irving Stone

Hawthorne, Calif.—Not too long ago aerial weapons evolved from a lot of specific requirements. The military called out almost everything—speed, ceiling, range, engine, armament, details down even to the type of gunight.

Today the approach is just about reversed—only a broad generality marks the beginning of a weapon system. A general defense problem may be projected; the specifics evolve as the solution.

The difference is complexity and effort between these two approaches is tremendous.

Today's job boosts the workload for metal analysts, structural mechanics who fit the best engineering terms. Not only is weight while on board, but all ground support material as well.

Opposition forces have become extremely short, equipment complication a staggering wild card may be catastrophic. Keeping the capabilities of the various components in a gigantic task.

All this points to the need for top analytical groups. One example of such a group is Northrop Aircraft, Inc.'s Weapon Systems Analysis Dept.

(WSAD), headed by Elmer K. West and his assistant, Ward B. Deane.

► **Typical Problem:** Take this general hypothesis problem:

Defend a continental U.S. target against attack by bombers or weapons (perhaps missiles, rockets or small manned aircraft) carried by them.

This is how a group like Northrop's WSAD would proceed:

First, determine the characteristics of the targets which must be defended, the manner in which they affect enemy factors, and the way these factors are limited by the characteristics of the subsystems.

Weapons which could be used to attack the subsystems are then to be considered.

Then develop the problem of detecting and locating the U.S. hosts and directing the ultimate weapon system (still undefined at this stage of the thinking) to the projected subspace.

► **Due Alert Choice:** At this stage of weapon development, periods of time required are considered. Time between alert and completion of emergency armament, and the time of defense determined to meet these time requirements, a constraint factor.

► If time allotted is moderate, the design requirements for the defensive weapon may yield a high performance, but reliable, with relatively small weight.

► If time requirement is severe, it set extremely strict—it may be satisfied by a supersonic missile aircraft.

As time becomes more critical, the performance of a defensive missile, possibly with a portion of its trajectory under control, may be maximized.

► When 40 sec to 1 min is the order of the available time, increasing emphasis

is placed on speed to accomplish the destruction of the subspace's weapon after it has been launched, since the cost of loading a weapon to attack the intruder directly might be greater than the cost of destroying its payload weapon. Whether it can be done, is another question.

► All these items, the study would be preceded with an examination of existing and planned weapon systems which the study under analysis would supplement. This, it might now be concluded that the best weapon system obtained from the user analysis would not provide a sufficient measure in defense to justify the expenditure of funds required for its development. However, it might be indicated that the coming weapon system is at a certain point and that improvements to it might be profitably explored.

► **Preliminary Design:** Enters—the general type of weapon system that could satisfy the conditions of defense, next step is to determine the specific design characteristics of the system component.

Here, the major portion of the design analysis would be done by Northrop's Preliminary Design Group with the assistance of specialized departments such as Guidance, Flight Controls and Servo Mechanisms, Fluid Dynamics, Structures.

It is important here to know what company's capabilities end up to off in a specific area with particular knowledge in a specific field.

In the transfer of responsibility from WSAD to Preliminary Design, the former recommends design objectives such as the missile's or plane's range requirement, payload, weather capability, altitude, speed, time to knock off the intruder, etc., condition of readiness to specified point, or a number of a similar nature. Whether continuous power would have to be supplied or whether power could be turned on upon receipt of the alert signal?

These objectives are presented to Preliminary Design for detailed definition of the weapon system configuration.

► **Follow Up Role:** At this point Northrop WSAD becomes a secondary function, taking on a follow-up role to preliminary design and iterative status, even as far along as the production stage.

In an follow up role, WSAD advances the progress of the design from the viewpoint of a complete weapon system concept, to some extent. But design iterations are selected on the basis of planned effectiveness.

Example: The terminal phase is the attack on the subspace. Should it be a high-altitude approach with a sharp turn-around or a low-altitude approach? The high-altitude approach might give a more accurate delivery system,

but intruders more vulnerable to the subspace's defense, the low-altitude approach might be less accurate but the weapon used against the intruder would be more difficult to detect.

This needs to be taken into consideration when the type of low is selected.

Similarly, there may be many other ultimate choices which would have to be analyzed carefully. At last look some of the factors may appear more important than others, but in relation to the overall problem, each is a key consideration, requiring as much analysis as ever other.

► **Programming Plan:** A third function of WSAD is to suggest new proposals made by Northrop in response to military service request, and proposals generated within department such as Procurement, Design.

In this role, WSAD sets up a pre-planning procedure which constitutes a complete weapon system development plan. The program managers

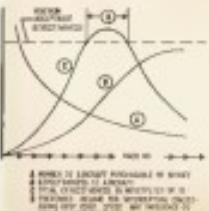
- Aircraft or missile development tasks
  - Ground-support equipment
  - Flight testing
  - Training
- The results that the complete a system and its associated associations with the plan to an single component will also be particular phase.

For instance, training is scheduled to include the training programs with adequate pre-project costs, so that the testing program will proceed according to plan. On the programming plan has shown that a particular piece of ground support equipment such as a test rig may be available when needed. Or, it may determine the number of aircraft, missiles, or units of ground support equipment which will be required for contractor testing and subsequent on-hands testing.

This is the first of a series of articles on weapon system design, development and operation.



TYPICAL CHOICE to be resolved in system definition is between high-altitude, high accuracy, low survival probability trajectory, or low-altitude, low-accuracy, but low-detectable trajectory.



► **PIE CHART** illustrates the main parts of a weapon system. Because which must be considered in the overall development plan. Any item which is not brought along properly can jeopardize the entire plan.

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## Defense Dept. Opens Titanium Laboratory

A titanium metallurgical laboratory to provide a source of detailed technical advice needed by government contractors and their suppliers has been established by the Department of Defense under contract with Battelle Memorial Institute, Columbus, Ohio. The move was recommended by Donald A. Quarles, Assistant Secretary of Defense [Research & Development].

The facility will gather and disseminate information and supply advice on production and application of titanium in military equipment. The laboratory will do work and advise the Research and Development Coordinating Committee on Materials of the Defense Department in appraisal of its titanium programs.

It will also aid government agencies and contractors in developing data needed for preparing specifications for titanium metal and melt products, and handle short range laboratory investigations to determine titanium difficulties.

The project will supplement existing contractor services that are provided by industry and government laboratories.



Meet 'Sierra Sam'

Two B-57s, "Sierra Sam," have been added to the family of "Sierra Sam" (short) atmospheric anthropomorphic dummy used in human engineering. New Models 157 and 160 faithfully reproduce dimensions and weight distributions of a six-foot 200 lb. man. They simulate cold and heat lifting flight gear. Models can sustain maximum load requirements for tasks to 100G. Company also manufactures factory repair service, parts inventory and staff of application engineers. Major Sierra Engineering Co., 112 E. Montcalm Ave., Sioux City, Iowa.

AVIATION WEEK, April 4, 1955



**TWIN COACH**  
*helps give the Sabre its edge*

Praised for its combat superiority with the United States in the skies over Korea, the Sabre Jet is now being supplied to other NATO countries.

Twin Coach Aircraft Division was selected as a subcontractor for large and intricate assemblies for the F-86 as well as for North American Aviation's other high-performance aircraft, the F-100 and F-104.

These important assignments are typical of the way in which leading aerospace manufacturers rely on Twin Coach as a source of major aerospace assemblies.

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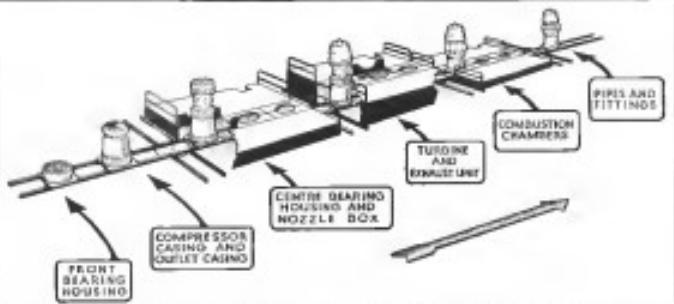
TWIN COACH AIRCRAFT DIVISION MAKES ASSEMBLIES FOR BOEING, CHESAPEAKE, GRUMMAN, NORTH AMERICAN, REPUBLIC, AND CLASSIFIED EXPERIMENTAL AIRCRAFT TYPES.



Twin Coach Aircraft Division plants have not-wing spans, made when needed. Here, complete power sections with plants begin electrical wiring under large assemblies.

**TWIN COACH COMPANY**  
*Aircraft Division* BUFFALO, N.Y.

# PRODUCTION



MOVING LINE has raised platforms at some stations to give easy access to upper portions of vertically assembled Avon turbines.

## Rolls-Royce Uses New Assembly Line

(McGraw-Hill World News)

London-Rolls-Royce has gone to a unique moving assembly line for producing Avon turbojet engines at its plant at East Kilbride, Scotland. Initially intended as a temporary measure, pending completion of a new plant and further use of construction, the new layout proved so efficient that it has been retained as a permanent production scheme.

This moving assembly line method contrasts with the static, single-spot system used at Rolls' main plant at Derby, England, where engines are assembled on hydraulic lifts by teams of craftsman who can perform any task.

Three vertical hydraulic lifts, installed in the factory floor, were to be the final installation of the new plant. Instead, each workman at East Kilbride initially remained in a temporary assembly bay while, now permanent, a small number of highly trained technicians. The expensive overhead lift was employed only in the capsule test area where they are used for repair work on aircraft engines.

**Definite Advantages**-Rolls-Royce officials cite three advantages of the assembly line in the hydraulic lift method of jet engine assembly:

- Less floor space in handling materials.
- Fewer workers needed per unit of capacity.
- Less time required to turn certain parts.
- Sharp, low-cost construction and maintenance.

Some of the stations are raised above the floor to facilitate work to be done at particular stages. The raised flooring

• Great flexibility in production capacity.

• Low capital investment.

• Negligible downtime ("a little point even three days").

• Great mobility-easy to move or set up plant locations.

• Easily adaptable to different size engines.

• Possible Disadvantage—One possible disadvantage of the assembly-line method favored by Rolls-Royce technicians is that it may be difficult to handle engine modification quickly.

In one emergency, ability to make modifications quickly may be of vital importance. This is, as an example, during World War II it became necessary to add 8 inches to the top end of the engine to enable it to carry the V-1 flying bomb. Rolls' assembly team, trained in all operations of the Merlin's Merlin engine construction, were able to begin turning out more powerful Merlin-powered aircraft.

Nevertheless, Derby is pleased with the lower cost of operation of its latest factory. It is expected that engine parts will go well gradually until the assembly line becomes standard.

**What It Is**-The line consists of a 65-foot-long track made up of metal "U" beams set on roller casters and bolted to the factory floor. Several work stations are arranged along either side of the track.

Some of the stations are raised above the floor to facilitate work to be done at particular stages. The raised flooring

at these stations is inclined to fit around the engine precisely and hang up to allow the engine to pass through the stations.

The engine starts at one end of the line on a specially built mounting base attached to a four-wheeled dolly. The engine, on its dolly, is pushed by hand from station to station, where the various engine parts and components are fitted on.

The engine then goes vertically as they move down the assembly line and comes from the far end as completed units.

Each stage is provided with a turntable which allows the engine to be rotated so all of the main production line as well as inspection and other specialized work. In case of emergency, the technology could be used as an additional assembly system.

**How It Works**-In fact, Rolls-Royce has organized the job to be performed at each station.

• First stage of the assembly line has two work stations to install the front bearing housing and intake.

• Second stage is for the adjustment to add compression ratio and compressor casting, excluding valve blocks.

• Third stage (first raised stage) has three stations to install compressor outlet casting, rear bearing housing, and auxiliary flow sections.

• Fourth stage is the highest and has three work stations for assembling the nozzle box, tail cone, auxiliary piping and fuel system parts.



FINISHING OPERATIONS are carried out on floor of static stage.



CONVEYOR TRUCKS feed parts from assembly to static line.



TURNTABLE allows Avon to be turned off the special work.

• Fifth stage is where combustion equipment is added—dome tubes, combustion chamber, etc.

• Sixth stage is for finishing operations, such as the combination of various accessories, etc.

The assembly line can easily handle a work load equivalent to the production capacity of 12 hydraulic lifts.

**Specific Savings**-Cost of the specific savings attributed to the assembly-line production system as compared to the hydraulic lift method are:

• Material handling is reduced—it is more efficient to convey parts and components directly from assembly line to production than they are loaded onto the main assembly line; thus it is easier to move all parts and components to many different stations. This economy alone saves approximately \$31,000 a year.



MACHINING SHOP LAYOUT at Rolls-Royce new Avon jet factory in East Kilbride, Scotland.



## Here's the inside story on Du Pont Aircraft Rivets

### Q. What are Du Pont Aircraft Rivets?

**A.** They're strong, one-piece fasteners resembling solid rivets, but without important differences enclosed in such a tiny, centered explosive charge which cuts the length of the shank (photo left photo, starred).

### Q. How do they work?

**A.** You simply drill holes, insert Air-Lift Rivets, apply heated rivet engine. Rivet expands...drives fastener into shank end...completely fills hole in as little as 14 second (photo at right).

### Q. How fast can you set 'em?

**A.** Up to 30 rivets in blind, hard-to-reach or open work, with no after-explosion cleanup. No punch hammer, knocking bar or other equipment, either—one worker does both blind and 30's-a-one-man, one-tool job!

### Q. What about primary and secondary applications?

**A.** Aircraft Rivets are designed to handle both. For example, one leading manufacturer uses them in the U-shaped channel members in engine assembly; another, to attach skin to wing.

ANY  
QUESTIONS?

You'll find answers to all in these two 22-page annual 46-page 12 diagrammatic publications from the DuPont Research Library. You'll also have DuPont Aircraft Rivets—specifications and technical drawings. And the solution to a tough assembly or repair job. For your free copy write: M. E. DuPont de Nemours & Co. (Inc.), 1000 DuPont Building, Wilmington, Del. 19804.

**DU PONT**  
**AIRCRAFT RIVETS**

A Product of DuPont Research



BETTER THINGS FOR BETTER LIVING  
IN INDUSTRY

The equivalent of 12-lb capacity, requires 24 ft-lbs plus two helpers. Two hydraulic lifts would support an aircraft with the 24 rivets, another acting.

• Most important, it takes time to move rivets to form a fillet to assemble a jet engine on hydraulic lifts since he must know every detail of assembling a jet engine. And it takes another six months for heat to reach maximum efficiency. On the assembly line, where each rivet needs know only one or two operations, training time is four weeks, perfection time another four weeks.

• Hydraulically-driven riveters found time in the pilot's floor, a compressor to supply hydraulic power, and heavy overhead traveling cranes for each lift site to haul away completed engines. The assembly line requires only that less, 4-in excavators in the factory floor to locate rivets, heavy cranes facilitate one riveting only at the end of the line. Light rivets are adequate to hit bottom of rivet hole and position of tip prevents weak rivets.

• Further savings results from reduction in tools required. In the case of the hydraulic lift, each of the 12 "trucks" requires a full set of tools. With the assembly line's departmentalized type of operation, apparently only two complete sets of tools are required for a 12-lb capacity operation.

• Versatility of the assembly line is evidenced by the fact that it can readily be changed to handle different sizes of engines. The n = job of considerable



### Sheathes for Magnets

Now 400-in dia cutting machine cuts aluminum sheathing on large magnets, such as those used in valve stations, for insulation and to simplify their installation. In cutting the iron back casting at 2,000 rpm, special holding methods are needed to hold the magnets on the two-piece metal-duty supply that uses magnetic pull<sup>21</sup>. A 1,000-pi permin motor spins the finished work from the machine. Some 80 of precision magnet plant of Cadbury Dept. of General Electric Co., Emerson, Mich.

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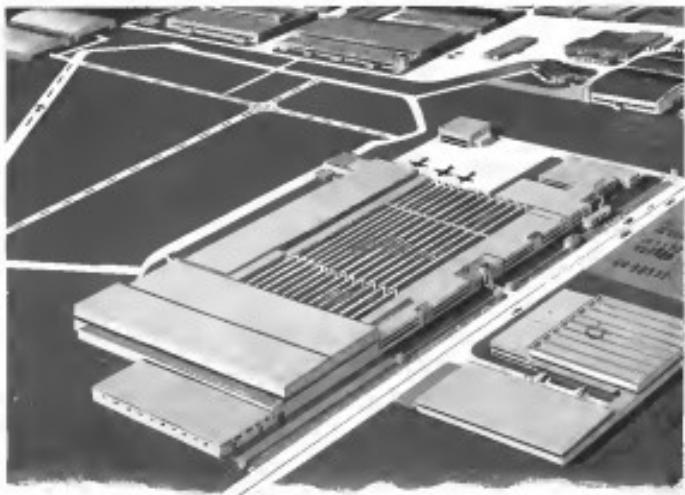


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100-100

## How Goodyear Produces B-47 Canopies



1. SLOVE-GLAZ workers lift hot sheet of heated Plastic laminate for bending on frame where shape will be blown at Goodyear's aircraft Corp facility at Akron, Ohio.



2. FORMED CANOPY is seen in upside down position in 70 cu. ft. pressure lat. is raised. Canopy is ready for removal.



3. OPTICAL INSPECTION in front of grid board shows up any distortion. Canopy in this photo is for Republic F-84F.



4. IN HOLDING JIG, sheet is held in place by permanent hold-downs. Compressed air blows sheet into canopy shape.



5. CONTOUR TEMPLATE is used to check all contours in within engineering drawing tolerances for warpage or distortion.



6. STOCKPILE OF B-47 CANOPIES await trim or frame work before final coat glass identification.



MANUAL WELDING allows speed of about three inches/minute. Automatic device (right) will expand application of no-rod welding.



TURBOP ASSEMBLY for long-weld made without filer rod. Clamp of sample weld (right) shows only small trace of heat insulation.

## No-Rod Method Better Titanium Welds

Important new titanium welding gear is used to provide durability equaling or surpassing that of the base metal, considerably improving the quality of aircraft parts from the ground up.

Basically, the process involves joining titanium sheets without using filler rod.

Since there is used to be no need for grinding titanium beads in thin aerospace, the problem connected with this requirement have been eliminated. Normally, titanium weld bead grinding causes more wear on abrasive wheels and take more time. Also, overheating at the past can result in localised embrittlement of the weld that can cause failure.

**Airframe Production**—The no-rod technique has been used in fabricating a turbopump assembly. The parts have been tried in heated production and are now performing successfully in service applications, it is reported.

The paper was discussed recently by Levy at the Los Angeles section of the American Welding Society. The paper was scheduled for another presentation at the Western Metal Congress, span-

ned by the American Society for Metals in Los Angeles last week.

**Design Improvement**—No-rod titanium welding's major improvement is the reduction of contamination from the surrounding atmosphere, enhancing the weld's durability. Levy and Wickham point out that the oxide layer on the rod itself also is eliminated.

Even initial experiments resulted in

weld rods being theory, indicating a maximum of contamination from the air.

Manually restraining oxidized after subsequent testing that joint properties could be improved considerably by modifying the welding variables. These include the configuration and material used in back-up bar, the effect of hold-down or drill bars, metal cleaning methods, welding machine settings, and the effects of oxygen gas flow on the face and bottom of the weld.

**Effect of back-up bar materials and configuration**—Original trials used a



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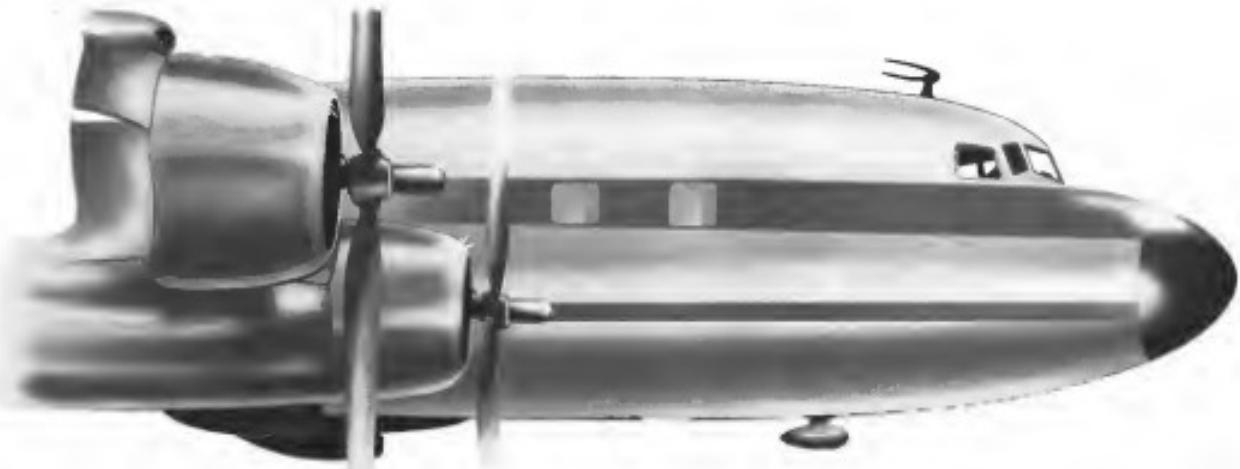
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AVIATION EQUIPMENT

48, 15 Feb. 68



base, ruggedized by smooth, rounded scale, withdrawn and cooled at cold running speeds, followed by a hot water wash to speed drying. Time in the salt bath varies from one minute to 15 minutes depending on the bath's chemical activity.

**Other Techniques:** To keep electrode fuming gases from entering the weld to a minimum, lowest possible current setting or heat input was used on the welding machine.

The machine is a P & H 200 IFP-GW in conjunction with an RW No. 4 Lincoln torch and a No. 8 ceramic cup and a 5-in.-x-2% threaded tungsten electrode.

**Argon flow effects on weld bead.** Since no filler rod penetrates the argon gas distribution system, the weld puddle is more uniform, untempered blanket is avoided, which allows control of the actual welds seen in a more uniform pattern.

Gas pressure setting is critical, the Marquardt engineers report, and it varies with weld thickness and gas flow setting: the higher the current and the thicker the material, the greater the gas flow.

To high a pressure creates two undesirable conditions. The lead joint has surface layover due to the weld being digested by the gas. Also, the gas pressure and configuration of

## Conditions for Welding Without Filler Rod

- Welding Machine: P & H 200 IFP-GW with torch RW No. 4 and 5-in.-x-2% threaded tungsten electrode.
- Back-up bar: 97 in. thick cold rolled steel rectangular plate 71 days x 17 wide (T is thickness of metal to be welded).
- One-eighth-inch holes for argon back-up gas placed about in series along the base starting two inches from the edge of the sheet.
- Hold-down bars: Mild steel bars 1/8 in. thick x 23 in. wide distributed on the left side at 45 deg. to 6 in. thick. Clamp bars as close as possible to the weld.
- Cleaning: Metal should be thoroughly washed with a stainless steel brush prior to welding or painted in a fine-pore
- Metal having a cleaned surface, resulting in a sharp point, is required for a satisfactory weld.

cleanliness produces a valley in the joint root.

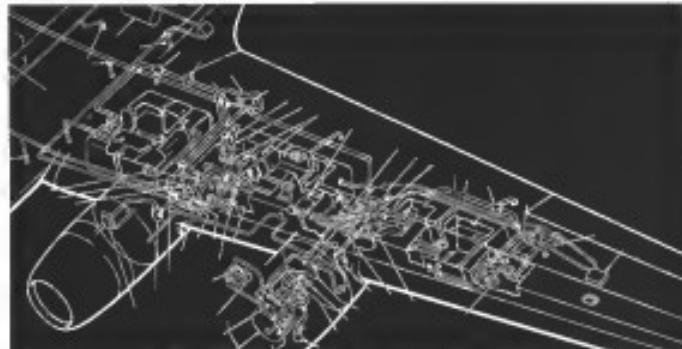
High argon pressure creates a gas flow pattern that tends to pull contaminated air into the joint. The effect of the argon pressure on the ceramic cup is noted to be potentially important in control of 0.50-in. and thicker. On 0.49-in. material, the flow rate was reduced to 12 cfm.

Hydrodynamic effect, 40% faster and both 1/16 and 1/8 in. metal scale is readily removed.

■ Machine setting: As low as possible to produce 100% penetration. For 0.49-in. thickness connect 25 amp., voltage 25 amp; dc, straight polarity.

■ Argon gas flows through the welding torch, 12 cfm for 0.49-in. thickness, varying with other thickness. For back-up groove, 12 cfm for each six inches of joint length of 0.49-in. thickness, varying with other thickness.

■ Metal welding speed: Approximately three inches per minute for 0.49-in. thickness.



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# TWIN J-57s POWER THE



**NEWEST FIGHTER** and the first with two J-57 engines, is this new "century series" Air Force fighter being tested at Edwards Flight Test Center in California. The big, long-range McDonnell F-101 is 67 feet six inches and has a wing span of 38 feet.



# NEW VOODOO FIGHTER

The most powerful jet fighter ever built in America—the first with two J-57 turbines—is joining the U. S. Air Force's supersonic team of "century series" fighters.

It is McDonnell's F-101 Voodoo, a long-range fighter-bomber capable of carrying atomic weapons and slated for service with the Air Force's Strategic Air Command.

Like its supersonic sisters, the F-100 Super Sabre and the delta-winged F-102, the F-101 Voodoo is designed to take full advantage of the tremendous thrust provided by Pratt & Whitney Aircraft J-57s and their afterburners.

In the new Voodoo, Pratt & Whitney Aircraft's J-57 continues to make its vital contribution to American Air Power.



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**OSCILLOSCOPE TRACE** shows whether beam focus is good or bad.

it is next to the laboratory for short-  
by another STUB motor. Interpretation  
of the oscilloscope's different wave-  
forms indicates the types of defects,  
such as underrunning, overrunning and  
overrun.

Consult-Pt. Worth engineers responsible for STUB motor development are R. M. Cunningham, E. L. Gray, G. F. Horn and J. L. Stuckling. The work at Standard was handled by James S. Arnold.

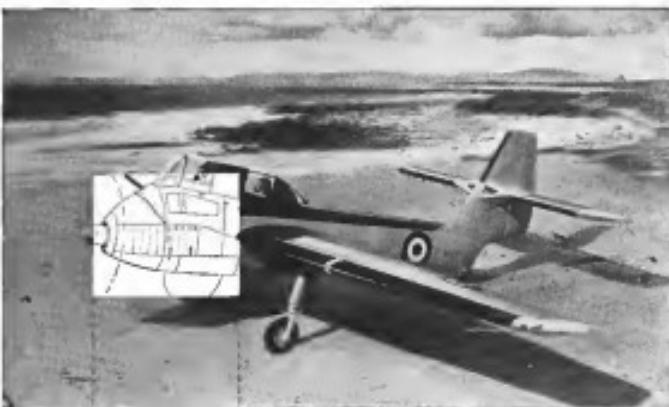
#### **SPECIFICATIONS**

— 1 —

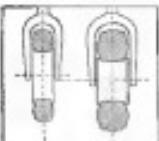
PERIOD (MONTH)	NUMBER OF SUBSCRIBERS	WEIGHT (PERCENT OF TOTAL SUBSCRIBERS)	CHARACTERISTICS								
			PERIOD (MONTH)	PERIOD (MONTH)	PERIOD (MONTH)	PERIOD (MONTH)					
1	2	3	4	5	6	7	8	9	10	11	12
1	10000	100	1.0	10.0	10	10	10	10	10	10	10
2	10000	100	2	10.0	10	10	10	10	10	10	10
3	10000	100	3	10.0	10	10	10	10	10	10	10
4	10000	100	4	10.0	10	10	10	10	10	10	10
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10	10000	100	10	10.0	10	10	10	10	10	10	10
11	10000	100	11	10.0	10	10	10	10	10	10	10
12	10000	100	12	10.0	10	10	10	10	10	10	10

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Conversely, flight duration contributes to the very low striking and landing speeds. The scenario requires the maximum length of runway in emergency landing or emergency

10

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Hydrostatic pump, hermetically sealed

## PRESSURE TRANSDUCER FOR USE UNDER SEVERE VIBRATION

**THE TRANS-SONICS TYPE 75 PRESSURE-OPERATED POTEN TIOMETER** will operate satisfactorily while subjected to  $\pm 25\text{G}$  vibration at any frequency up to 2000 cycles per second.

*This is  $2\frac{1}{2}$  times the acceleration and 4 times the frequency range of Paragraph 4.7.1, MIL-E-5272A.*

No vibration mounts or other trouble causing gadgets are employed to accomplish this. The resistance to shock and vibration is built in the instrument mechanism itself. For further information request technical data on Type 75 BARORESISTORS.

**TRANS-SONICS, INC.**  
7 FOREST STREET, BEDFORD, MASS.

Corp., South Bend, Ind., manufactured plastic for certain aircraft. 715-217. Manufacturer of aircraft components and flight control systems. **Trans-Products**, Inc., was formerly a division of **Trans-Turbine Corp.** Carpenter & T. J. Knobbe, 201 1st St., Suite 1000, San Francisco, Calif. 94101.

**Tele-Mite**, Inc., 1950 Rockwood Rd., Mt. Clemens, Mich. 48034. 2,000 sq. ft.

**Thermocouple Div.** of **Wright Co., Inc.** 11145 Elmwood Park Dr., Wilsonville, Ore. 97031.

**Thermalloy Mfg. Co.**, 2040 E. Paulina Street, Chicago, Ill. 60616. 100,000 sq. ft.

**Thermalloy Metal Seal & Color Works, Inc.**, 101 Adams Ave., Elkhorn, Wis. 53121. 100,000 sq. ft.

**J. A. Thompson, Inc.**, 10777 1st Ave., Middle River, Md. 21206. 100,000 sq. ft.

**U.S. Precision Components, Inc.**, 10000 3rd Street, New York, N.Y. 10036. 10,000 sq. ft.

**U.S. Precision Components Corp.**, 912-913 River St., Newark, Del. 19713. 100,000 sq. ft.

**United Optical Mfg. Co., Inc.**, 100 5th Street, Worcester, Mass. 01608. 40,000 sq. ft.

**United Technologies Corp.**, United Tech. Park, Hartford, Conn. 06138. 70,000 sq. ft.

**United Technologies, Inc.**, 100 Church St., Stamford, Conn. 06902. 100,000 sq. ft.

**Universal Research Co.**, 1000 W. 35th St., New York, N.Y. 10001. 100,000 sq. ft.

**Universal Scientific Co.**, 1410 Glendale Plaza, Glendale, Calif. 91205. 100,000 sq. ft.

**Universal Specialty Co.**, 1410 Glendale Plaza, Glendale, Calif. 91205. 100,000 sq. ft.

### PRODUCTION BRIEFING

**► Rheostat** that dissipates 3,000 kw has been built by General Electric Co.'s industry control department for a wind tunnel at USAF's Arnold Engineering Development Center, Tullahoma, Tenn. Device weighs 40,000 lb when full, will vary current passing into large blades that regulate temperature of air passing through the tunnel's test section.

**► Penco-Semicon, Ltd.**, Toronto, has been organized as a subsidiary by **Aerospace Corp.**, Jackson, Mich. The U.S. firm acquired all assets of Penco relating to its flexible bond and siliconizing coupling business.

**► Robinson Aviation, Inc.**, Teterboro, N.J., has signed a contract with Port of New York Authority for construction of a 12,000-sq.-ft. plant on the northeast corner of Teterboro Airport. The plant makes vibration control equipment.

**► Aeromont Components, Inc.**, is the new name of West Coast Metal & Supply Co., recently acquired as a subsidiary by **Trans-Turbine Co.**, North Brighton, Pa., and moved from Los Angeles to the parent company's Chelten Avon Dr., Santa Ana, Calif. The subsidiary makes flexible chuting to feed smelters.



1969—Boeing's 100th aircraft assembly building

### Boeing offers engineers long-range careers

Back in 1927 engineers designed airplane wings in simple terms of wood and cloth. An airplane wing of today is a complex aerodynamic structure housing a myriad of electrical, mechanical and hydraulic systems.

Yet many Boeing engineers of 1927 are still with the company. They have grown with the science of aviation—especially in its potentials, and contributed to its progress.

What engineer in 1927 could fore see the nature of the aerospace industry today? They saw only a challenge—an

opportunity—to make a future. If you seek similar challenges—creation of porosity—and growth potential—you can find it at Boeing.

Boeing is seeking more engineers of ability—Research, Design and Production. Today, one out of each seven Boeing employees is an engineer. You'll work on such diverse programs as: The B-52 and B-47 nuclear bombers; The 707, America's first jet-powered transoceanic transport; Research in nuclear-powered and supersonic flight. One of the nation's major guided missile

programs, the BM-59 Bomarc piloted missile. Beyond that? Engineers will establish the future pattern.

Boeing has openings for virtually all types of engineers—electrical, civil, mechanical, aeronautical and related fields, as well as in applied physics and mathematics with advanced degrees.

For full information on career opportunities at Boeing, send résumé of prior education and experience background to:

JOHN C. SUNDIN, Staff Engineer—Personnel  
Boeing Airplane Company, Dept. B-10, Seattle 14, Wash.

**BOEING**  
SEATTLE WASHINGTON MILITARY AIRCRAFT

"Cherry Rivets are here soon after delivery. Many types of riveting jobs (both fasteners are required)" says American Airlines.



## Cherry Rivets speed overhaul and repair at American Airlines Depot

Keeping the large American Airlines fleet in top operating condition is a big job that requires an extensive equipment and supplies inventory, a stock of special equipment, a large stock of replacement parts—plus good services such as Cherry Hand Strength.

At American Airlines' Tulsa Overhaul and Supply Depot, for example, there is a large stock of rivets, a variety of the Cherry Rivet and its application in the overhaul and repair of air equipment. Cherry Rivets are used in the overhaul of aircraft communication equipment, passenger seats, secondary structures, interior panels, aircraft interiors, and aircraft. They prove to be most satisfactory means of riveting where blind fasteners are required.

Here are six other repair shops of the world's airlines. Cherry Hand Strength

provides a fast, safe, more method of fastening. These six specify regular strength rivets for economy of riveting and quality of service. For replacement of fractured sections and parts. That gets shop out of the shop faster—gets them back on the pressure quicker—helps keep operating expenses down.

For example:

•**Hartnett Aviation Supply Co., Los Angeles,** has opened a branch office in Ft. Worth, Tex., in charge of Western Branch.

•**Bridgestone-Thomson Co., Robertsville-Campbell Corp. Co.,** is building a \$3-million plant at Milford, Conn., scheduled for occupancy in July. The Milford plant will make metal bellows and elastomeric couplings for their division.

•**Hess, Goldsmith & Co., Inc.,** has established a Western Division in Los Angeles to handle an increasing demand from aircraft and missile makers for fiber glass materials. In charge of the new facility is Paul A. Ershoff.

To learn how you can speed repair and reduce maintenance costs with Cherry Hand Strength to aircraft and other industries, write for Bulletin TS-7B—it's yours for the asking.

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Sales Department  
New Brighton, Pa.

Please send to me without obligation Cherry Hand Strength Bulletin TS-7B.

and provide disposal of spent links and cartridge cases.

►**Cold-sawcut TV** will be used to ferment pictures of parts, parts and component repairs and for conferences between Bethesda and Forest Park, N.Y., plant of General Aircraft Engineering Corp. Also a mobile TV camera will permit Bethesda personnel, 50 mi from Forest Park, to watch tests at the latter plant.

►**M. H. Sweet Engineering Co., Bronx, N.Y.**, plans to design and produce air navigation equipment, navigation and research and development a photostatic mapping instrument. President of the new firm is Monroe H. Sweet, formerly of American Chair engineer is Jessie Gottsch, previously with American and Link.

►**Taylor Machine & Manufacturing Corp., maker of electro-mechanical and pneumatic actuators and hot air valves for military planes, plans to build a factory, double its present 35,000 sq ft, facility, in Vernon County, Calif.**

►**Hartnett Aviation Supply Co., Los Angeles,** has opened a branch office in Ft. Worth, Tex., in charge of Western Branch.

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►**Hess, Goldsmith & Co., Inc.,** has established a Western Division in Los Angeles to handle an increasing demand from aircraft and missile makers for fiber glass materials. In charge of the new facility is Paul A. Ershoff.

►**Fairchild Camera & Instrument Corp.** is building a 24,000 sq ft plant near Los Angeles. Occupancy is planned for June.

►**Modulite-type high vacuum furnaces** have been delivered to Mechanical Laboratories of Westinghouse Electric Co., Blawerville, Pa., by Consolidated Vacuum Corp., Rochester, N.Y. Westinghouse will initially operate the unit at 100% capacity. By retorching and adding equipment, the furnace can be expanded to 1,000% capacity without disturbing basic installations.

►**Dynamic Sales Enterprises, Inc., 103 Park Ave., New York,** has been named by Fairchild-Candid Metals Div. as sole representative for electronic laboratory equipment and other industrial devices developed by the firm as a corollary to its metals electronics work.

## Cold-Forming Tool Spins Metal Parts

Selected savings in material and labor costs in the cold-forming of complex metal components for use in high temperature areas of turbines are expected in Solar Aircraft Co. from use of a new 35-ton Hydrospin Machine recently shipped to the firm's San Diego, Calif., plant.

The 350 rpm, now made from a hexagonal casting which is then machined and welded, can be adapted to the Hydrospin for 305, Solar's 300.

A snap set for the machine will be in forming dies designed to produce components previously they had been machined in two sections and welded together, requiring special dies and fixtures. The Hydrospin will form them from a blank disk.

Solar states that on certain parts, Hydrospin takes only one-fourth as much material as used in forging per part.

Parts made with the new machine also are claimed to have greater fatigue resistance than made with former methods, because the process provides shear deformation, resulting in work hardening the material and increasing tensile strength.

The Hydrospin unit rotates a steel



**HYDROSPIN** allows shape matching, part cutting, stamping, and

disk or hubbed, and two metal rollers force the metal over a rotating section into the desired shape while rollers ad-

vance it along a preset course. Except for loading and unloading, the machine is automatic.

Made by Cincinnati Milling Machine Co., Ohio, the machine is priced at approximately \$100,000. A somewhat smaller cold-forming

inclusion, called flow forming, was de-veloped recently by Pratt & Whitney Aircraft (AVN Sept. 13, 1954, p. 25).

## ODM Grants Writeoffs For Aviation Facilities

American Locomotive, Inc., Rockville, Md., has been granted a write-off of interests in Office of Defense Mobilization for a military aircraft com-pounds facility costing \$1,214,310, with 65% allowed for capital incorpo-ration.

Other companies recently issued

Prudential Trust & Savings Co., West Orange, N.J., has been granted a write-off of interest in Office of Defense Mobilization for a military aircraft com-pounds facility costing \$1,214,310, with 65% allowed.

•**General Dynamics Corp., Falls Church, Va.** has granted a write-off of 60%, or \$1,214,310, of its interest in a military aircraft com-pounds facility costing \$2,000,000.

•**General Dynamics Corp., West Orange, N.J.** has granted a write-off of 60%, or \$1,214,310, of its interest in a military aircraft com-pounds facility costing \$2,000,000.

•**Aviation Industries Corp., Seattle, Wash.** has granted a write-off of 60%, or \$1,214,310, of its interest in a military aircraft com-pounds facility costing \$2,000,000.

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## Riddle Stretching C-46 Engine Period

Riddle Aeroarts hopes to raise over half one of the PW K550-51 Mills, powering its C-46s to 1,000,100,1400 hrs as a result of accelerating over 17,000 hrs in the region without a single failure. The company currently is getting 1,100 hrs with no major failures.

During the 17,000 hr period only two mid-life engine overhauls were required; engine replacements were changed cylinders and low case taper factors. All engines, including the ones that were reconditioned, operated 1,000 hr between

overhauls. Riddle states:

The MIT modification was developed by Av. Com. Engin. Service, Morris, N.J. (AW, July 5, 1964, p. 64).

Changes include larger diameter cylinder for improved cooling, larger capacity oil pump and inter-stage seal and valve mechanism, also modification of the blower section.

## F-50D Turbopump Is 3-in-1 Unit

A new air reduction system has been cut 25% from the weight of F-50D Superjets on which it is in-

### Big Mod Job

Finally the most extensive modification of a commercial aircraft ever undertaken is now taking place at Lockheed Aircraft Service International's new hangar at New York International Airport.

The service agency is completely modifying a number of Boeing Starliners recently purchased by British Overseas Airways Corp from United Air Lines. The "from the ground up" changes include such major operations as replacing flight engineer's and navigator's stations, complete cabin rebuilding, complete passenger cabin rebuilding resulting in increased interior容积, luggage racks and convertible seating arrangements, new propeller and complete paint job. Six aircraft are involved. Another three of BOAC's Starliners are undergoing like-extensive modifications.

Stilled, the project is in production at General Electric's Lynn, Mass., works. Called a "turbojet," the unit incorporates three pumps in one and is reported inside the fighter's fuel tank, chambering fuel for reheat booster and high-speed pumps and much

heavy piping and wiring, according to CG.

The 15-gpm pump is driven by bleed air from the plane's J47-33 jet engine. The pump's heat exchanger separates pressurized fuel and waste fuel flow requirements for the F-50D's high rate of climb.

## OFF THE LINE

AC Spark Plug has appointed five new sales offices with extensive territorial coverage in part of an expanded aircraft parts program. The distributor will carry ACP's complete line of aircraft spark plugs as well as more AC aviation instruments. The distributor Pacific Automotive Corp., Bellwood, Calif.; South West Aerospace Corp., Dallas, Aransas, Corp., Michelin, N.J.; Van Doren Aircraft Supplies, Inc., Minneapolis; and Standard Auto Engine Ltd., Worcester, Conn.

Lockheed Aircraft Service International, N.Y. International Airport, Immokalee Drive and L-700 (airline and commercial strength) in 1954 followed by rechristening and incorporation, an income of 755 planes over 1953. Most planes handled were DC-3s with DC-6s and Super Constellations following. LASE employs 1,100

## There's a NEW Difference in Bits!



### LOOK AT THESE UNRETouched PHOTOGRAPHS—Zephyr Bits look good as new. The others are spent.

Both underwent the same rough test—drilling No. 2 round head Phillips screws into aluminum holes of .070 gauge body steel at 750 RPM under 60-lb torque/torque load.

Repeated test after again, tests prove IN EVERY INSTANCE that Zephyr Bits average twice the ruggedness of other makes.

### Why ZEPHYR Bits last longer... save time and money

**DEFINITE FORGED BITS BY AN EXCLUSIVE PROCESS**—Controlled heat treatment gives them their extra toughness and makes them last longer. To make certain they perform as promised, every batch of bit undergoes severe torque testing and wear test before delivery... assurance to us and assurance to you of complete satisfaction.

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### Navigation Trainer

Pilot navigation at simulated speeds of 175 mph and altitudes of 10,000 ft. can be undertaken in this new Link D-2 trainer installed at Mather AFB, Calif. The huge device is composed of a 25-mm spherical structure set on two sets. More than 500 revs, securely positioned lights duplicate the map size of 32 countries over the Northern Hemisphere above 15deg North Latitude. It was developed under USAF contract by Link Aviation, Inc., Wethersfield, Conn. N.Y.

## STRESS AND STRUCTURES ENGINEERS

Many challenges are ahead and structures engineers in jet aircraft, guided missiles, and space electronics are available at Northrop Aircraft. The engineers specified will be involved in aircraft and missile design and test, and will be supported by Northrop's well-known computing facilities. Thus, each individual will be afforded opportunities to develop to the utmost within his allotted field.

Contact:

Employing Personnel Manager

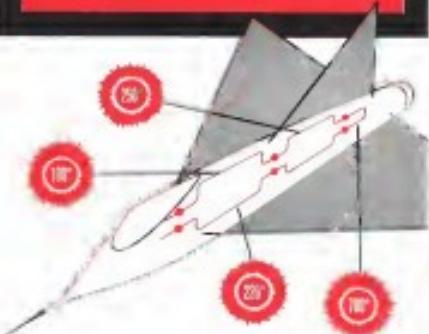
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**An Edison First!**  
**Separate alarm points in**  
**a single circuit**  
**with a continuous coaxial**  
**cable fire detection system**



Edison was first to offer a fire detection system allowing

separate cables during different survey stages

alarm points to be series-connected in the same circuit. Developed

at the world-famous Edison Laboratory, the system permits a single loop to protect a number of areas varying in temperature with a single control unit.

Exclusive spring clips and the single flexible coating cable assure simple installation even in irregular and inaccessible areas. Other features include

• rapid response—reponds rapidly to fire • detection and check resistance—the sensing cable resists normal wear to an extent of only

• instantaneous sensing principle—eliminates possibility of false alarm due to moisture or excessive debris

• over 1000' maximum—15 mils dia. without amplitude of any kind

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**Thomas A. Edison**

INCORPORATED

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# NEW AVIATION PRODUCTS

## Tubeless Tire Passes Impact Tests

Development of a high-pressure tubeless tire has capable of absorbing the severe shock of landings or take-offs at 300 mph, which was achieved by B. F. Goodrich's Test & Equipment Div. The Goodrich tire is the first of its type.

According to Test and Equipment Div. president Arthur Kelly, the new tire recently passed impact tests of 10,000 lb. at 300 mph, although it is no larger than a passenger car tire.

One of the main features is a special tread capable of withstanding the extremely high temperatures and stresses developed by high speeds and heavy loads.

The dynamometer used to test the new tire employs an electromagnetic clutch between the electric motor and the steel wheel that controls the speed to the predetermined desired rate, and can be controlled while the wheel is in operation. In the dynamic impact landing tests (the tire has not yet been tried out in an actual landing), the new tubeless tire was

runned against the wheel, spinning at 100 rpm. The tire was held against the wheel for a length of time equivalent to the distance an aircraft would travel in the runway when taking a landing.

Kelly says the new tire uses up to 80% of total weight. Basic construction principles are similar to those patented and used in B. F. Goodrich tubeless tires for passenger cars. A layer of special rubber inside the tire seals in the air replacing an inner tube. Radial cords extend on the outer side of the tire bead prevent loss of air around the rim flange.

Another of the main tire potential uses consists of tire balance and vibration monitoring at high-speed operating vibration. Design of a ground tire is also illustrated. In addition, the types of special rubber used in the tubeless tire enables it to remain at maximum range. Thus, the conventional tire for impact tests, Goodrich says.

B. F. Goodrich, Test & Equipment Div., Akron, Ohio.



UNITS come in 12, 26 and 113-c. models.

## Portable Power Generator Weighs Only 30 Lb.

First of a complete line of portable electric power generators designed for ground use around airports and variable for lighting, operating electric motors, heaters, or airconditioning and supplying power for radios, has been developed by Low-Cat Div. of Lear, Inc. Weight is 30 lb.

Model 5900B requires 26 cc. at 30 amp continuously. Fuel consumption is under 0.5 gal./hr. The engine has an automatic annual starter and a muffler.

The auxiliary generator comes equipped with a current limiter. See bypass circuit and disengaging switch, also long oil coolers shifting around when operating or stored. Other models range from 22-c. to 110-c. engines.

Low-Cat, 3172 South Bundy Drive, Santa Monica, Calif.

## Panagra DC-7s to Get Mated Berthing Chairs

Berthing arrangements will be simplified on Pan American-Gulf Airways' new fleet of Douglas DC-7s by use of a new line of seats that eliminate the need for two types of berthing chairs to make up a double berth.

The seat maker has designed Airline Mathematics that set contained on the bottom to meet with the seat motions and load conditions of the berthing units. Full berthing chairs are stated to have all of the comforts and safety of reclining lounge seats. The middle armrest is hinged sober and full berthing double to form one double, if so desired.

Full berthing chairs are designated Model 3994 series; airplane day-reclining lounge chairs are Model 3915DA.



STARTING PACKAGE has panel Nava available to replace lists. Two versions are available.

## Jet Starter Package Fits on Tow Tractor

A jet aircraft starting package (start box) that fits on the rear of a tractor has recently completed U. S. Navy Bureau acceptance tests, the manufacturer reports.

Originally designed for use on aircraft carriers, the unit is 21 in. high, 45 in. long and 26 in. wide with the seat folded. Weight is approximately 400 lb. It operates an Allis-Chalmers gas turbine compressor which delivers 185 psig of compressed air for starters, jet starters, an aircraft-type auxiliary, starting relay, reduced speed air valve, auxiliary fuel-booster pump and a 4-gal. external oil tank.

The control layout permits the vehicle driver to operate all aircraft functions, as they may be handled separately.

Night Recording Camera Handles Missile Tests

Testing of missile injectors in the jet of a spin night recorder can be developed under U. S. Air Force contract for Rockwell Aircraft Guidance Systems.

Designated JRG, the camera has 9 in. x 3 in. dia. lens, 6-in. Kodak Aero-Ektar 12.5 x 12 in. focal length. The focal plane shutter will handle time exposures. An extender-lens will provide remote coverage operation.

Coronel Enterprises, No. Hollywood, Calif.



... and then we built

*the main rotor transmission  
for the S-55 Sikorsky Helicopter.*

High on the list of "things we are proud of" at IGW is the transmission shown here (demonstration cutaway).

Precisely built to transmit 700 H. P. with an input speed of 2400 RPM and a reduction ratio of 11.348 to 1. In spite of high stresses and great complexity the service life of this transmission has been outstanding.

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None of moisture, long service life and low initial cost makes dependable **DuraFlex** Spark Plug Leads first choice for replacement by more and more of the country's leading airline operators.

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Durable Spark Plug Leads for all types of engines are maintained in stock at our factory for prompt shipment. For complete information write today or call our office nearest you.

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Engineering Office: Suite 100, Philadelphia; Newark; Boston; Chicago; Atlanta; Seattle; Los Angeles; Portland; Denver; Kansas City; St. Louis

series. Cleaners are now available for interchange with all Douglas bathable seats in DC-6, DC-6B and DC-7 transports and are also on hand for track-mounting on Douglas, Lockheed or Boeing Line-type tracks in these Douglas and Lockheed Constellation planes.  
Herdman Tool & Engineering Co.,  
Los Angeles, Calif.



**RUSTPROOF** clamp holds plastic lead

#### Hand-Tightening Enough For Plane-Conduit Clamp

A new clamp for holding flexible plastic tube wire conductors in place on aircraft can be tightened by hand, eliminating use of tools and saving many man-hours during mounting, the maker states.

Device is machined from aluminum and has an oxidized rugged finish. When used in conjunction with a galvanized adapter, a waterproof joint is possible between the conductor and the plastic conduit.

H. E. Bugle, Inc., Toledo, Ohio

#### ALSO ON THE MARKET

Autostatic gear grinder, costing about \$77,000 each, is offered to small shops. Special tooling designed into the grinder is used to eliminate need for high inventories of costly special tools. Complete setup can be made in existing or newly-constructed areas.

Reflex Instrument Corp., College Point, N.Y.

Fleet Power, Inc. of Macedonia, Ohio, manufacturer of aircraft engine accessories and related equipment and test devices, has appointed Aerofit Industrial Marine Sales Co. at Gulf Coast representative. Aerofit Industrial's address: Van Avercamp Building, Mobile, Ala.

Portable arc welder has voltage characteristics making it particularly useful for inexperienced welders or mechanics. Rating is 15-160 amp, permitting welds of 1 in. thick. Unit may also be used as a cutting torch by heating, melting, lifting and welding at heat and air pressure.—Skinner Engineering Co., Sunnyvale, Calif.

# a NEW computer... with a SPECIAL purpose...



## LINK AEROLOG PERFORMANCE COMPUTER

Backed by more than a quarter century of experience gained from the designing and building of Flight Simulators and Trainers which duplicate actual flight conditions—Link Aviation, Inc. now introduces its newest development, the AeroLog Performance Computer.

This special purpose computer instantly solves the physical aerospace performance equations. Computation is continuous during the introduction of input variables.

The Link AeroLog Performance Computer eliminates the time-consuming iteration of performance equations by

utilizing medium or general purpose computer methods. Normal flight input data of the aeropilotics—i.e. computer designed for his own personal operation.

Reactive equations of motion are solved without added analysis or iteration. Secondary corrections in case of errors due to flight path curvature and reagent changes are introduced and compared with uncorrected accuracy.

And there are but a few of the advantages of the new Link AeroLog Performance Computer. We would be pleased to furnish complete data at your request.



Autostatic, an automatic lead holder and conductor tool, is a 1500 watt 110-120 volt AC electrical device for use in aircraft maintenance. It provides quick and easy lead installation and removal. It features one-hand clamping, a positive automatic grip mechanism, a pliable cable jacket, and other distinctive features.

# Western Europe's Answer To The 'Knock Out' Attack

...and where... our friends are at? The only  
answer we can give is in a series report from  
one thing is certain. The days of  
thousand-bomber raids and other destructive  
days of war are over for good. Security  
now lies in efficient training of aircraft  
detectors and the speed and fire-power of  
fighters that can fly in all weather.

This is what makes the Gloster Javelin an  
important. It is now certified operational world.  
The improved radar, fast power and intri-  
cate high rate of climb of this supersonic  
aircraft puts new teeth into Europe's first line  
of defense against world war.

No other interceptor day and night fighter  
parks such a big punch as the Javelin. And  
because of its highly sensitive integrated  
radar system, no other fighter is as quick and  
accurate at getting to the "knock-out" in  
time.

From Armstrong-Whitworth engineers  
comes the Javelin specially tailored air power.  
From the first hints of warning, the Javelin  
can be striking at over 50,000 ft. in a very  
few seconds. Reaching and destroying  
after a matter of minutes.

It is true to say that no other all-weather  
fighter made elsewhere has such range, speed  
or destructive firepower. In fact, the Javelin  
has already attained the status of legend in  
Western Europe's favor. This key aircraft  
was designed and developed by Gloster,  
makers of the world's first successful jet ac-  
cident and one of the remarkable Hawker  
Siddeley Group of companies.

## THE WEATHER

Widespread fog

Vast areas of low pressure will sweep  
Europe this week. The best time for dry  
weather is the British Isles. But there is  
some chance of rain in Scotland, Northern  
Ireland, France, Italy, Spain, Portugal, and  
Greece.

Follow the fog banks  
during the next seven  
days. The areas of low  
pressure will move west  
gradually. Winds will  
increase.

Editorial

## Gloster Javelin

GLOSTER AIRCRAFT LTD., GLOUCESTER, ENGLAND. Member of the Hawker-Siddeley Group of Companies and World Leader in Aircraft.

## COCKPIT VIEWPOINT

By Capt. R. C. Robson



## Insured Manpower

Low enrollment rates, according to military spokesmen, is one of the most serious problems in connection with maintaining the desired level of strength of the Armed Forces. For instance, recent skilled military men are simply dropping out of existence, especially when their first "batch" is up.

No less an authority than Air Force General Donald E. Tabbott recently stated, "Generally we are losing more than \$2 billion a year in trained manpower. And one observer has put it, 'If the Air Force were losing the same amount of trained manpower each year, there would be a deficit of 17."

► \$2 Million per Month. That figure is not hard to arrive at when it is considered that it takes well over half a million dollars to turn out 30,000 pilot trainees per year. That would be a deficit of 17,000. And the expense of those five years of training produces an amount not only to put a price on, but also is an important part of national strength.

Without attempting to delve into the many causes of this state of affairs, nor to provide a ready answer to some of these, the following idea is offered for what it is worth. It is designed primarily for pilots who may find themselves (or other persons)

Folks in the Air Force, as do many other specialists, receive extra "bonus" pay—in this case, "Basic pay." While it is by no means the only consideration for the job, it nevertheless constitutes a sizable portion of a man's income, and its importance should not be understated.

► Is the Bonus Best?—Receipt of that bonus pay obviously contingent upon the holding of a pilot's license. Therefore, a premium against loss of bonus, due to physical disability, might help induce some military pilots to remain in service.

Airline pilots, ranked all professional pilots, are somewhat in the same boat.

Their cause is dependent upon one small certificate. Let an eye go out, a heart increase leak through or a finger enter the flesh (either happens and, hopefully) there goes the pilot's work.

Since so long there have been a strong demand from airline pilots for some sort of insurance to take care of this situation. It was not thought of as being a remunerative program, since a lifelong "pay me" proposition, but rather as an expense for a few years to allow an individual time to change his method of livelihood and still provide for family with that occasional bonus.

► Pilot Insurance.—Through efforts of the Air Force Pilots Assn., this kind of bonus' insurance was brought into being about a year ago. For the small annual renewal premium, members receive up to \$500 a month for approximately three years if any physical disability precludes their holding a pilot's license.

Without a doubt this plan was received by ALPA members as being one of the most important pieces of society they could obtain. There is no reason to suspect that Air Force pilots would not also gain from a similar scheme. And with more participants, it is possible that greater benefit might result.

Fortunately, the Air Force, and other services as well, have recognized the need for keeping skilled people and are making an attempt to ease some of the problems.

Many of these men are difficult to solve since military life is inherently associated different than civilian. It is hoped at all quarters that additional legislation will be made. Skilled manpower is the most important natural resource of our country, and all steps should be taken to insure the nation against its loss.

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## AVIATION CALENDAR

Apr. 11-15-American Society of Lubrication Engineers, 10th annual meeting, Hotel Sherman, Chicago.

Apr. 14-16-American Defense Assoc., symposium of Prepress Central Instrumentation Corp., Patrick AFB, Fla.

Apr. 14-16-International Airship Association Council, 8th convention, See Picoconocochee.

Apr. 16-18-American Association of Air Pollution Control, 15th annual conference and business meeting, El Cajon Conference Hotel, El Cajon, Calif.

Apr. 18-20-American Society of Automotive Engineers, 10th Annual Meeting, American Motoring Association Products Forum and Aircraft Designing Division, Hotel Statler and Michigan Room, New York.

Apr. 18-20-American Society of Mechanics and Engineers, Diamond Jubilee spring meeting, including first aviation seminar, Long Beach Convention Hall, California.

Apr. 20-22-American Helicopter Society, spring meeting, Baltimore.

Apr. 24-26-Western Operators Council, eighth annual meeting, Santa Barbara.

Apr. 25-26-Society for Instrumentation and Control, spring meeting, Hotel Statler, Los Angeles.

Apr. 27-29-American Helicopter Society, 10th annual meeting, Hotel Mayflower, Washington, D.C.

Apr. 29-May-1-Midwest Aeronautical Conference, University of Michigan, Ann Arbor.

Apr. 29-Institute of Navigation, annual regional meeting, Elmwood Park, Illinois.

May 2-9-New England nuclear-electronics meeting, sponsored by Boston and Connecticut Nuclear sections of IEEE, Sheraton Hotel, Stamford, Conn.

May 3-8-Society of Automotive Engineers, annual conference, Duluth Hotel, St. Paul.

May 3-8-Instrument Society of America, first annual Flight Test Instrumentation Symposium, Allis Hotel, Wichita.

May 10-12-International Aviation Trade Show, Hotel Plaza, NYC Segment Agency, New York.

May 5-7-East International Aircraft Maintenance Expo, Wall Rogers Memorial Coliseum, Ft. Worth.

May 5-8-National Inter-Collegiate Flying Assn., annual convention and air meet, Miami Field, Ft. Worth.

May 8-10-Association of Motion Picture Camera Operators, annual convention and meet, Ley (N.Y.) Municipal Auditorium.

May 9-12-National Conference on Aerodynamics, Edgewood, Baltimore Hotel, Dayton.

May 16-20-National Materials Handling Exposition, produced by Clegg & Polk, International Advertising, Chicago.

May 22-24-International Conference on Quality Control, ninth annual conference, Hotel Statler and New Yorker, New York.

May 28-Federated Avionics Association International and KNVNL Royal Netherlands Avionics, 8th International Air Display, Teterberg Aerodrome, The Hague.

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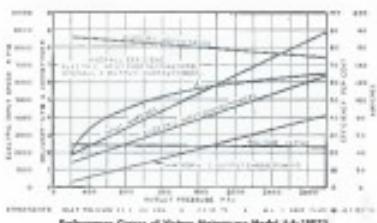
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## American Renews Airfreight Campaign

By Gordon Conley

American Airlines believes the air transport industry is lagging in its chance to build air freight into a major profit center. To strengthen out its own operation, AA is trying to change airfreight from an emergency service to a routine shipping method.

The new campaign will stress speed as the primary advantage. But American is showing shippers how they can cut expenses by using the fast delivery service on a door-to-door basis.

**Re-thinking air freight.** The concept of major economies through fast deliveries is not new. Since the start of airfreight, carriers have tried to sell shippers on the idea that speed would more than make up the difference between surface and air rates.

"But air transportation made no attempt to back up this concept," says Thomas J. Harris, American's manager of cargo sales. "Now we came up with facts and figures that could be applied to individual companies to prove fast delivery was possible."

As the first scheduled airline to start airfreight in 1948, American had a hand in writing the service chart. Now AA is putting approximately \$100,000 into a program designed to plug gaps in statistical proof of airfreight's economy.

**Advantageous.** The cargo manager adds one exception: At present, AA shipped agree to an analysis of their individual operations, American believes it can show how savings are possible through:

- Greater speed. In most enterprises, faster shippers would let them do business with less goods on hand. This would reduce warehousing costs, cut handling expenses and lower the number of items that become obsolete or strength.

- Speed also would allow manufacturers to give the same fast service they provide at their immediate regions to customers in distant cities, opening the way to new markets.

- Better performance. In air transport, American says, there is less chance of damage, since there is considerably less surface damage due to considerably lower

- Shipping methods. Administrative costs can be reduced, because total rates,



AMERICAN DC-8 unloads freight at LaGuardia less than 24 hr. after leaving West Coast.

zoeht and more tracing, weighing and classification requirements for airfreight are coming into play.

With facts and figures to back up their arguments, American believes the greatest rate of expansion for the ton-mile future is in the big revenues now being handled by airfreight—but only on an emergency basis.

These leading economists are also economists and parts, moving supplies, machines, cutlery, electrical equipment, aircraft accessories and parts, biological materials and drugs, printed matter, aerial birds, engines, radios or sheets, cloth and fabric, advertising displays, newspapers, letters and photographs, hardware, electronic equipment, paper and related products, dry goods,

meat and automobile organs. Increased demands for operations services are trying to capture airfreight services to meet new demands.

"The elasticity of shippers is changing," says J. M. Glad, director of cargo services. "They are more demanding. They aren't satisfied with the service of a year ago. When a shipper used to allow for a 24-hour delay, he now plans immediate use of planes."

That is an industry problem. If we are to retain the shipper's confidence, we've got to deliver on schedule."

To meet the stricter requirements, American is concentrating this year on establishing better standards of service and accurate information on schedule capabilities.

**Commodities.** Advantage—Operations personnel believe they have a better chance of satisfying these customer demands than other airline carriers at all-freight action. "We have a tremendous advantage over all cargo lines," they say. "We have a big passenger fleet to back up our freighters."

Normally, AA plans on raising 60% of its freight on established passenger routes. The freight fleet will increase its payload when American takes delivery in 1955-57 of four Douglas DC-8s now on order, giving the airline seven of the largest aircraft.

American's DC-8s carry a maximum of 31,000 lb. at range 12,500 lb. on short runs and 22,500 lb. on long-range flights. The maximum with 20,000 lb. is for freighters DC-4s and with 8,100 lb. is for DC-6Bs, 6,700 lb. on DC-5s, 5,500

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is an DC-6 and 2,000 lb on Convair 240s in the freight passenger service.

"On DC-6 flights," operators experts say, "we seldom run out of space." Profs Fausto-AA has only one complaint about the new Douglas freighter. Its operational cost doesn't permit

lower rates, and we've got to reduce them to get airfreight volume equal to the passenger operation."

But the DC-6 is the first of its type to show a profit. American's all-cargo DC-6 is not making money except with a load factor of at least 90%.

## Senate Committee Praises Copter Services in Feeder Airline Report

Senate Interstate and Foreign Commerce Committee strongly encouraged the bid of the three helicopter services in New York, Chicago, and Los Angeles for permanent certification.

In approving legislation granting permanent certificates for the 14 existing local service airlines, the Senate committee expressed in "great satisfaction" for the promising effects of the three certified metropolitan helicopter carriers. It agreed to the Senate bill.

### Certificate Benefits

The Senate committee anticipated that these benefits will follow from permanent certification:

- "The increased and extensive diversity of executive talent to certificate assigned responsibilities will be needed so that executive talent can be devoted to managing the operations of the system more effectively and thereby better serving the traveling public and presenting more competitive rates."

- "The expense modified upon the receipt by certification proceedings, estimated upward to \$100,000 for each carrier, will be minimized and that money can be devoted to advertising, to such capital improvements as maintenance and expansion aids."

- "The great expense and inconvenience to states and cities and other users of the feeder service who must devote great effort to supporting applications for renewal will be ended. Likewise the

Understandable costs saved by both Senate and House Commerce Committees—one of which will be approved in July—become the Civil Aviation Board would have to give the 14 local bus service certificates within 120 days after enactment unless it can be shown that renewals after the last certification has been "indefinite and indefinite."

The committee formally discussed CAB's argument that permanent certificates would "freeze" local route patterns and preclude improvement. That pointed to the provision of the 1938 CAB Act giving the Board authority to "alter, amend, modify or suspend" in whole or in part, any route.

The Senate bill also would authorize CAB to exempt from permanent certification up to one-half of the airways it plans to use in a carrier's route system.

Profs Fausto-AA—the local airlines now have a total route coverage of 30,000 miles—argued that permanent certi-

cates respond to the Federal government's intent of having the Civil Aviation Board conduct such proceedings will be terminated and we may substitute a consequent reduction in the administrative expenses of the Board."

- "States and municipalities which have invested money is encouraged to offer well known transportation services that their contractors in those facilities may be considered strengthened rather than operated."

- "The protection of American commerce and national safety will be furnished by strengthening and making permanent the system of local air carriers which flew with 23 million passengers to, from, and between the small and intermediate air cities last year."
- "The local carriers may develop long-range planned programs and allow long-range routes to complete. In the past all contracts of employment with local service carriers have been short-term and have led to a pronounced turnover rate that of the local carriers in carrying passengers high frequency and relatively low fares."

- "The local carriers may, after passage of this legislation, make long-term assignments for hangars, operational equipment, maintenance, and other facilities with the management companies to themselves and the government that are available from such arrangements."

- "Users of the services of the local airlines will be able to plan more plans and expansions of, or addition to, old plans with more confidence that the air service on which they depend is permanent."

### New Aircraft

- "Aircraft manufacturers may be convinced that they should design and build an aircraft tailored to the requirements of the local service airlines. Up to now the local carriers have been forced to fit aircraft exclusively on the DC-3-type aircraft. While this is a good way to sell present airplane, it has caused to be developed an aircraft more efficient for low-cost regional operations. At the present time no other American carrier is as yet for the feeder except such hand-me-downs from the truck airlines or Convair or Martin."

- "These, like the DC-3, are good airplanes for the reasons for which they were designed, but once again their utility to the feeder airlines is to be most questionable, questionable. Helicopters, however, have been most reluctant to undertake a new design of a true local-service-type aircraft because of their doubt that there would be any customers to worth an aircraft by the time it was designed and ready to fly. Passengers of this sort will more than likely than not local airline service is here to stay."

• The local service airlines will be able to establish sensible financing programs on a long-range basis. Such advantages as premium interest rates on loans, loan periods based on temporary certificate dates, personal guarantees on corporate officer loans, and many other practices which the insurance actuarial of the Federal practice have visited upon them may be either reduced or waived."

## Board Asks Airline Reaction to Crash Axe

Civil Aerostatics Board has asked industry comment on a further proposed requiring each user on scheduled airline transports and marks for baggage carts on the event of an accident.

The Board's original proposal was to take effect April 1, but industry comment has been deferred until May 1 pending response from the air line industry.

Major objection of the industry was the suggested requirement for a second cockpit when more than 30 passengers are carried.

CAB readily acknowledged that further study revealed no necessity for a second cockpit use. The Board also eliminated the requirement for cockpit windows on the outside of the aircraft fuselage.

CAB's proposal now, if adopted, would amend CAB Part 40 to read: "All airplanes shall be equipped with at least one main engine and all emergency exits shall be clearly marked at each end from the outside."

# Transportation Policy Draft Favors Railways, Release Unlikely

Focus of competition could fade.

A basic concern of the report is with rates. The Interstate Commerce Commission, which controls railroad rates, would have its powers retained mostly. It is recommended that the ICC's power to set rail rates also be expanded, but that it retains the power to set maximum. Time intervals used by the ICC in changing rates would be lengthened. Other rates are advised a little while longer the railroads over other forms of transportation.

Repeal of governmental advantages in bargaining for rates among carriers is recommended.

• **Railroad Policy**—Another important item in the recommendation that railroads be allowed to engage in the bag and trucking business. This is viewed as a move which could lead to restraint of competition and retard development of technology forms of transport in favor of railroad vehicles.

Any encouragement given to a transportation mode is a recommendation that the transportation rates on freight and passenger be apportioned, something all types of carriers have been fighting for years.

• **Double-Mileage**—These recommendations have not received the blessings of the White House, as are the final recommendations of the committee. The issue involved has proved so hot that the group working on it has had trouble as far as producing an acceptable document.

The report is being prepared by a committee headed by Sen. George McGovern, D-S.D., Sen. George Smathers, D-Fla., and Sen. George Aiken, R-Vt. It was started nearly a year ago with the purpose of drawing up a transportation policy for the Administration. It was submitted to be completed by Dec. 1.

Some of the opposition to the program has come from within the government itself. The Department of Agriculture is unhappy about the effect it would have on farmers, and the Defense Department and Central Services Admistration do not like the heavy expense of their ability to get advantageously rates by negotiating among carriers.

• **Monopoly View**—Department is reported to be concerned with the manager types of recommendations that the railroads and other forms of transportation industries

Support of the position of one industry agent as follows is viewed as a feasibility since by political observers the administration isn't expected to

### U.K. Backlog

Backlog of orders for large British transports now numbers 214. The total was pushed over 200 with British Overseas Airways Corp.'s order for 20 of de Havilland Aircraft Co.'s new Gnat jet and six modified Musk 2 (AW Mar. 21, p. 4).

The backlog also includes orders at:

- Vickers-Armstrongs, Ltd., for 125 turboprop-powered Viscounts. Forty-nine of the medium-haul transports have been delivered.

- British Aerospace Co. for 36 long range, medium-haul, Bae 146s. Options have been taken on an additional 10.
- Hawker Siddeley, Ltd., for 29 passenger aircraft.



London Opening New Passenger Terminal

Two-stop major connector London Airport's new rented terminal and loading docks. Built atop open Apr. 17 will be served by British European Airways and 10 continental airlines who together handle 75% of arriving and departing passengers. Ground floor is of upper right. Offices, briefing rooms, meteorology and public facilities will be located in subflooded building at left. As terminal facilities will cost an estimated \$100 million.

## Civil Airframe Shipments Decline

Civilian aircraft shipments in January amounted to 897,700 lb in airframe weight, Department of Commerce reports. This compares with shipments of 102,380 lb for the same month in 1954. The breakdown:

	January 1955	December 1954	January 1954
Complete aircraft	360	298	276
By weight of aircraft			
Less than 3,000 lb	125	272	214
3,000 lb and more	22	16	24
By number of planes			
1 to 5 planes	122	263	215
More than 5 planes	25	25	25
By total kg. of engines			
Up to 350 kg.	137	383	213
400 kg. and more	38	27	25
Total value of completed parts (\$100 thousand)	\$20,393	\$18,595	\$16,496
Aircraft	73,337	12,294	24,822
Less than 3,000 lb	3,914	3,279	3,006
3,000 lb and more	19,421	9,324	21,412
Aircraft parts	5,446	5,541	6,335
Total aircraft engines and parts (\$100 thousand)	\$42,393	\$13,985	\$11,497
Aircraft engines	7,996	6,836	6,936
Engine parts	6,396	7,169	5,585

published a report which would antagonize either the trucking industry or the airlines, both as politically potent.

The last time when the effects of the committee will take a uncertain. There is a good chance that no agreement will be reached, but that the findings of the committee will come in the wake of the bill's introduction. Most observers agree that any proposed legislation would have to be considerably older than current practice in order to have a chance of getting through Congress.

## New Orleans-Mexico Route Near Decision

Validity of Eastern Air Lines' certificate for a New Orleans-Mexico City nonstop route, now deposited with President Truman, for the consideration at 1952, appears near settlement.

Civil Aeronautics Board insisted that

the route in the New York-Mexico City nonstop case. Eastern's own part of the objectives of the other two applicants in the proceeding—American Airlines and Pan American World Airways—► **Similar Issues.**—The board directed CAB examiner Edward T. Shobels to accept brief from the interested parties, as well as Braniff Airways and Western Air Lines as the sole users of the valid fit of the certificate of Eastern for a New Orleans-Mexico City route. Braniff and Western were included on the basis that similar legal issues exist with respect to certificates for Mexico City issued to them.

## IATA Cuts Air Cargo Rates Across Atlantic

Lower rates on some air cargo shipments between North America and Europe will become effective July 1 under a new rate system adopted by scheduled carriers in North and Middle Atlantic routes.

The new rating system, International Air Transport Assn. said, will reduce the several thousand existing special rates for specific types of cargo to less than 50 broad classifications.

► **20% Reduction.**—Basic general cargo

rates remain unchanged, but their application to specific types of cargo will be revised, IATA said. The agreement is subject to approval of IATA, Civil Conference and interested governments.

Pan American World Airways predicted that the new rate structure would provide a 20% reduction in rates for non-economics representatives of 75% of the North Atlantic business.

With C. Lepage PAA's vice president for traffic and sales, forecast an increase of at least 90% in the trans-Atlantic air cargo business, on the basis of the new rates. Present air cargo business which totaled 20 million lb. for 12 airlines in 1954, is expected to total 30 million lb. in the first half year of operation under the new rates, Lepage said.

John Brantley, IATA traffic director, said: "The essential aim is to make cargo airfreight simpler, easier, more attractive, and cargo rates cheaper."

► **Mid-Continent.**—Pan American estimated that the new rates would bring an average of 15 cents per pound to 26 cents per pound on the airline's charges.

The present 38% discount for group rates of 400 lb. per cubic foot will be dropped in favor of other tick discounts within the commodity rating system.

The resulting 25% discount for general cargo shipments weighing 100 lb. or more will be retained.

## Los Angeles Airport Raises Airline Rent

Los Angeles—Five major airlines holding base leases at Los Angeles International Airport have concluded negotiations with the Board of Airport Commissioners on passenger terminal facilities and rates to be paid by the airlines.

The Airport Commission agreed to expand the terminal spaces and enlarge its to provide necessary additional passenger handling facilities.

Immediate consideration will be given to the expansion program, and construction is expected to get under way during the current year, according to the Department of Airports.

The airlines agreed to pay annually an additional \$37,200, as recommended in the survey made for the Commission by Aviation Services Co. of Minneapolis. To compensate the \$6,000 loss in certain phases of the airport operation and for the use of these new facilities, the agreement will be effective when the new facilities are completed.

Carriers include American Airlines, Pan American World Airways, Trans World Airlines, United Air Lines and Western Air Lines.

Other issues are being settled, but their resolution to specific types of cargo will be revised, IATA said. The agreement is subject to approval of IATA, Civil Conference and interested governments.

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## Braniff Asks Court to Void Merger

Braniff Airlines moved last week to block the merger of Continental Air Lines and Pan American Air Lines by asking for judicial review of the case.

The U. S. Court of Appeals at New Orleans, La., has been asked by Braniff to review the terms of Civil Aeronautics Board orders drafting with the merger and to stay the effectiveness of the orders until review is completed.

Braniff had already asked the Board to reconsider its action in approving the merger. The CAB turned the case down. When Continental and Pan Am said they would complete their merger action April 1, Braniff initiated proceedings in the federal court to block it.

► **Violations.**—Continental's failure to receive a waiver is a strong possibility, if Braniff can get the court to rule in its favor.

The carrier estimates losses of \$34.750 annually through increased competition from Continental when it takes over Pan American's routes and delegates them with its own.

In asking for a stay of the CAB's order, Braniff said it would be difficult if not impossible, to "overcome" the situation if the merger goes through and the court subsequently finds the orders valid.

The petition for review asks the court to reverse the CAB as the merger Braniff says the Board didn't treat the case properly in respect to dealing with the company's objections and in violation of the Administrative Procedure Act. Then, says Braniff, the order can stand.

► **Transfer Discrepancy.**—The carrier argues a legal question on the Civil Aeronautics Board's power to transfer Pan Am's certificate to Continental. The Pan Am certificate expired Sept. 30, 1954, but the carrier continued to operate under a law which authorizes such operations while the CAB is attempting

to reach a final decision on the爭議 issue.

Braniff contends that such temporary operating authority is not transferable, and that the Civil Aeronautics Board doesn't have the power to infer the transfer.

## CAB ORDERS

### GRANTED

Trans World Airlines is granted an exemption to provide fair transportation to technical representatives of Lockheed Aircraft Corp., Wright Aeronautical Corp. and Martin Standard Division, UAC, for purposes of scientific observation on the aircraft.

► **Opposition.**—Continental Air Lines' motion to enjoin the merger of Pan American and Braniff International Air Lines was denied.

Midwest Airlines is granted an exemption to serve Route No. 2, Mo. 1, to April 1, 1955.

### APPROVED

Interlocking relationship between Stokely-Van Camps and John W. Alton, a director of Stokely and vice president of Northwest Air Craft Inc.

Agreements between United Air Lines, American Air Lines and various other carriers relating to intercompany arrangements.

### AUTHORIZED

Chicago Helicopter Ltd. to conduct regular public flights between Tampa, Florida, Calais, and Portland, Wash., until May 31, 1956.

### AMENDED

Order amending an agreement between the Flying Tiger Line and American Airlines and Freight Traffic Inc. to clarify the duration.

Order for Route No. 2, Mo. 1, to Atlanta, Ga., as an intermediate point between Elko, Nev., and Salt Lake City, Utah, and June 30, 1957.

### ORDERED

Suspension of certain fares filed by United Air Lines to extend to Jan. 20, 1955, or as often as necessary for re-opening.

Suspension of certain fares filed by Northwest Airlines to extend to Jan. 1, 1955, or as often as necessary for re-opening.

### DISMISSED

Portion of the Civil Aeronautics Board's order to Western Air Lines to extend to April 1, 1955, or as often as necessary for re-opening.

The Air Transport Conference Agency Resolution Case, since the order issued on June 20, 1954.

### DENIED

Petition of certain airlines filed by

## SHORTLINES

► **Alliedair Airlines** marks six years of existence this month. Traffic has increased from 9,698,000 passengers in 1949 to 42,6 million in 1954. Last year's total increased approximately 35% over 1953.

► **American Airlines** received the National Safety Council's Award of Honor for its 1954 employee safety record. American's 1954 accident fatality rate of 2.9% over 1953. Total accident rates for 1954 were 327,163,000, compared with 361,736,000 the previous January.

► **British European Airways** flew more than 255,000 passengers over its London-Perito route in 1954, a 12% increase over 1953. Income of about 55,000,000 reflected the route would show a net profit for the first time since it was started in 1949.

► **North Central Airlines** had an operating profit of \$30,236 and a net of \$15,754 in January, marking the first profitable January in the company's history. January 1954 operations showed a net loss of \$51,909.

► **Pan American World Airways**, last October's third world flight between San Francisco and New Zealand via Honolulu and Fiji.

► **Central Airlines** boarded 6,189 passengers last month, a 70% increase over February 1954.

► **Latin American** airline, will introduce two Convair 440s for its Manila, Paranao and Manila services April 17. Manila-José Joni service will be extended to five flights weekly.

► **Riddle Airlines** earned 1,991,146 lb. of freight in March, compared with 1,500,572 lb. during February 1954. In the 12-month period ending Feb. 28, Riddle earned 10,651,581 lb., compared with 15,107,368 lb. during the same period a year ago.

► **Scandinavian Airlines** reported a 65% increase in commercial freight tonnage in January and February over the same two months last year.

► **Southwest Airways** Nov. 2, 1966, 6,022 revenue passengers in February, a 4% increase over February 1954. Passenger load factor increased from 53.5% to 60.2%.

► **Swissair** passenger traffic increased 25% during 1954, freight gained 22% and mail 15%.



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## EDITORIAL

# More Wigg Flipping In Britain

AVIATION WEEK's exposure of the numerous charges on British security leaks by Senator member of Parliament George Cecil Edward Wigg (AW Feb 18, P. 94) was introduced on the floor of the House of Commons in London during recent debate on the air ministry. We quote the text of that debate as reported in the March 16 *Hansard*, official report of parliamentary proceedings:

Mr. Charles Ian On-Ewing (Conservative from North Hertford): "Would the hon. Gentleman care to comment on the report in *'Aviation Week'* which says . . . the MP, from Denley has flipped his wig. This is a prime example of how a poorly informed politician can baffle the public on the real military security problem with his nonsense cruse of 'wolf' when no real danger exists."

Mr. Wigg: "I gave way to the hon. Gentleman but he has abused my courtesy. I thought that matter would be introduced during the debate and my speech will now have to be a little longer than I intended."

"I shall tell the House why this attack was made on me by *'Aviation Week'*. It was because I put down three questions on the Order Paper about breaches of security. There was not much in two of them, but the third one, dealing with infrared, in my opinion, is a gross breach of security. If I am wrong in that I hope one of the members on the front bench will say so."

### Wigg's Accusation

The periodical attacked me because the leak about the subject was revealed to a representative of that periodical by a senior member of the Royal Air Force when the member of the staff of *Aviation Week* was at a barbecue and the RAF officer was speaking off the record. A representative of *Aviation Week* broke that embargo and when I put a question down I was attacked in the American press. I am proud of that. The American press would not get out of its way to attack me at great length and circulate a copy of what it says is attacking me to the hon. Gentleman on the other side of the House.

Mr. On-Ewing: "It did not."

Mr. Wigg: "I was not near the mark."

Mr. On-Ewing: "It did not do that."

Mr. Wigg: "It was used to every paper in London."

Mr. On-Ewing: "I read *'Aviation Week'*."

Mr. Wigg: "Maybe the hon. Gentleman does, but it did what it did because I got very near the truth. I affirm that major security breach came about as a result of an action of an officer of the Royal Air Force which in certain circumstances I am prepared to reveal to the government. On one condition that they will allow the representative of *Aviation Week* in the courts with an officer against attorney and court martial the Royal Air Force officer concerned. If that does not satisfy the hon. Gentleman opposite, I suppose nothing will."

That when Wigg is brought to bay he admits these "not much" in his first two charges of security viola-

tions—one of which came from a public statement by the Canadian Defense Minister and the other from the 1954 SBAC public flying display. If Wigg has the quality of free play that distinguishes most Britons he would readily acknowledge there is not a shred of truth in these charges.

Indeed, Wigg attempts to cover his tracks with more charges against *Aviation Week* and the Royal Air Force. Let us recall well that his immunity on the floor of Parliament, should he face answering the consequences of those falsehoods.

### Refutation of Charge

Mr. Wigg clings to his belief that disclosure of infrared-guided missiles is a security breach. Apparently he is not aware infrared was first used for missile guidance in 1944 when the Germans tested it in their *Wasserfall* anti-aircraft missile at Prorastrand. This German infrared data along with later work done by the American Air Force and Navy has been known publicly for many years. Mr. Wigg carefully shuns away from explaining why he believes infrared guidance is a security breach. Then he follows with an allegation that official British military secrets were disclosed to *Aviation Week* by a senior Royal Air Force officer at an "off-the-record" barbecue and that *Aviation Week* violated the officer's confidence.

Both statements are false. No *AVIATION WEEK* staffer attended a barbecue either in or "off-the-record" at which a senior RAF officer was the speaker or at which British missiles were discussed. Consequently no information on an infrared missile could have been communicated that way. Nor could *Aviation Week* have possibly violated an RAF officer's confidence. Either Wigg received gross misinformation or he has fabricated this story from the whole cloth.

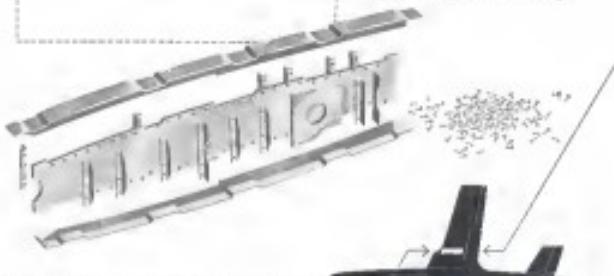
### RAF Integrity Secure

*AVIATION WEEK* has dealt with many senior and junior officers of the Royal Air Force during its eight year coverage of British aviation and has found them to be ardent protectors of their country's security on the ground as well as in the air. Wigg's accusation shatters the integrity of his country's valiant defenders. *AVIATION WEEK*'s integrity as a reporter for confidences is too well known among the military, aircraft industry and government officials who deal with us regularly insofar any harm from Wigg's irresponsible statements.

If Wigg is an honorable man he will apologize to both the Royal Air Force and *AVIATION WEEK* for his slanderous charges and publicly withdraw them. If he does not, we ask him to step down from the Parliamentary committee that now protects him from the due process of law and to repeat these charges publicly when he can be brought to book for them.

—Robert Hots

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These advantages will enable cargo transports powered with these engines to carry heavier payloads faster at far less cost than present aircraft.

And in passenger operation, smooth-running Allison Turbo-Props will provide quieter, more comfortable flights—and permit speeds better than 7 miles a minute.

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